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ABSTRACT

This document presents the proceedings and papers of the sixth statewide invitational conference on institutional research, 1973. Conference papers concern: the concept and implementation of the University of Georgia course contribution matrix; an approach to improving college classroom instruction through a teacher accountability model; the construction and some possible uses of an induced course load matrix; selection of academic majors; a comparative study of native and transfer students; educational funding-definitions of faculty effort categories; student instructor-course evaluation-- a factor analysis and multivariate analysis of variance studies; an examination of recent trends in grade-point averages at Florida State University; CLEP in the state universities; some implications for instructional research and planning of interinstitutional course registration articulation agreement; STEM Student Tracking Enrollment Model--a procedure for quarter-by-quarter enrollment projections. A list of invitational conference membership and attendance are included. (MJM)

ED 084977

A Potpourri of Institutional Research Studies

PROCEEDINGS OF THE
SIXTH STATEWIDE INVITATIONAL CONFERENCE
ON INSTITUTIONAL RESEARCH
1973

HE 004 866

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A POTPOURRI OF INSTITUTIONAL RESEARCH STUDIES

PROCEEDINGS OF THE SIXTH STATEWIDE INVITATIONAL CONFERENCE ON INSTITUTIONAL RESEARCH

Tampa, Florida

June 28-29, 1973

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PREFACE

As the institutional researcher becomes a more accepted and active member of his institution's staff and gains the respect and confidence of his colleagues, the requests to which he is asked to respond become more varied. When asked the question, "What do you do in Institutional Research?" he is almost at a loss for a reply and it might be easier to list what he does not do.

The theme of this year's invitational conference, "A Potpourri of Institutional Research Studies" was selected to reflect the widespread services and interests of our membership. Both those who defended their theses and the active audience participants (there were few docile spectators!) came away wondering, "Would that idea work at my college?" If this effect continues long after the conference setting has been forgotten, the work of the Planning Committee will not have been in vain.

The sincere thanks of the Planning Committee goes to every member of the Florida Statewide Invitational Conference and if the future is bright, it is only because you light the way. It has been a privilege to serve as Chairman for the 1973 Conference and my personal thanks is expressed to each of you who gave so freely of his time and advice thereby making the task a pleasure as well as an honor.

Archie B. Johnston
Conference Chairman and Editor

HISTORICAL PERSPECTIVES

When Archie Johnston began the task of editing the papers for the proceedings of the 1973 conference, he asked me to write a brief statement giving historical perspectives to the annual conferences of institutional researchers in Florida for inclusion in the volume.

I acceded somewhat reluctantly, as I fully remembered that I had documented the developments and occurrences leading to the series of annual conferences for the 1972 proceedings at the request of John Nickens, editor for that volume. Once I began to prepare the statement requested by Archie, however, I saw in clearer light the logic of his request. Although the attendance at the annual conferences has a nucleus of persons who have attended the conferences from the beginning of the series, each year sees the appearance of new faces. Newcomers for each successive conference are entitled to have information about the origin of the conferences, themes of previous conferences, and the names of former program chairmen, and other details about the meetings.

Even so, I shall attempt to avoid producing a statement similar to the one titled "Historical Perspectives" that appeared in the 1972 proceedings. Instead, I will in the main outline when and where the previous conferences were held, cite the conference theme for each year (which became the title for the proceedings), and give the names of the program chairman and local arrangement chairman.

The need for a series of annual invitational conferences planned especially for institutional researchers emerged at a meeting held in June 1968 at Winter Park. Originally scheduled as a meeting for institutional research officers in the state universities, the meeting was expanded to include representatives from all sectors of higher education in Florida.

As the June 1968 meeting in Winter Park progressed, the presentation of papers on institutional research topics seemed to have struck a responsive chord among the persons in attendance, for they unanimously approved a motion that a statewide conference patterned after the meeting taking place become an annual affair.

Six annual conferences have been held since the Winter Park meeting of June, 1968. Although the idea to schedule annual conferences originated at the 1968 Winter Park meeting, that meeting was not cited as the First Annual Conference in that planning of the meeting was not wholly in the hands of the attending researchers. The Lakeland meeting in November, 1968 marks the beginning of the series of annual research conferences, as it (and all conferences to follow) was planned by the conference participants themselves.

Annual Statewide Invitational Conferences on Institutional Research

First Annual Conference - November 21-22, 1968

Place: Lakeland, Florida
Conference Theme: Institutional Research and the Student
Program Chairman: G. Emerson Tully, Director of Educational Research, Florida Board of Regents
Local Host: Richard R. Burnette, Coordinator of Institutional Research and Testing, Florida Southern College

Second Annual Conference - June 19-20, 1969

Place: Miami, Florida
Conference Theme: Institutional Research and Student Diversity
Program Chairman: James L. Wattenbarger, Director of the Institute of Higher Education, University of Florida
Local Hosts: Matt Steele, Associate Director of Institutional Research, University of Miami, and Gustave G. Wenzel, Director of Institutional Research, Miami-Dade Junior College

Third Annual Conference - June 25-26, 1970

Place: St. Petersburg, Florida
Conference Theme: Institutional Research: A Data-Gathering Approach to Support Administrative Decisions
Program Chairman: Richard R. Burnette, Coordinator of Institutional Research and Testing, Florida Southern College
Local Host: Edward I. Stevens, Director of Institutional Research, Florida Presbyterian College (now Eckerd College)

Fourth Annual Conference - June 24-25, 1971

Place: Winter Park, Florida
Conference Theme: Application of Institutional Research
Program Chairman: Richard H. Whitehead, Dean of Admissions and Records, University of Florida
Local Host: Norris Miner, Coordinator of Institutional Research, Seminole Junior College

Fifth Annual Conference - June 29-30, 1972

Place: Gainesville, Florida
Conference Theme: Institutional Research in Transition
Program Chairman: John M. Nickens, Professor in Education Administration
Local Host: Joseph Stafford, Assistant Dean for Academic Affairs, University of Florida

Sixth Annual Conference - June 28-29, 1973

Place: Tampa, Florida
Conference Theme: A Potpourri of Institutional Research Studies
Program Chairman: Archie Johnston, Director of Research and Systems, Tallahassee Community College
Local Host: Dennis H. Goodwin, Coordinator of Student Studies, University of South Florida

G. Emerson Tully
Director of Institutional Research

1973

CONFERENCE PLANNING COMMITTEE

Dr. George Barton	Nova University
Mr. Edward B. Cottrell	St. Petersburg Community College
Mr. Dennis H. Goodwin	University of South Florida
Dr. Archie B. Johnston	Tallahassee Community College
Mr. Norris Miner	Seminole Community College

SIXTH ANNUAL
FLORIDA INVITATIONAL CONFERENCE ON
INSTITUTIONAL RESEARCH

A Potpourri of Institutional Research Studies

Downtown Holiday Inn
Tampa, Florida
June 28-29, 1973

Thursday, June 28, 1973

Afternoon

12:00-12:30	Opening Address: A. B. Johnston Local Arrangements: D. H. Goodwin
12:30-1:00	Invitational Address: Albert B. Harley, Vice President for Finance and Planning, University of South Florida
1:00-1:30	Course Contribution Matrix - A. A. Sterns and F. H. Wise, University of Georgia
1:30-2:00	An Approach to Improving College Classroom Instruction Through a Teacher Accountability Model - A. B. Smith, University of Florida
2:00-2:30	The Construction and Some Possible Uses of an Induced Course Load Matrix - N. Miner, Seminole Community College
2:30-3:00	Round Table Discussion of Above Papers
3:00-3:30	Coffee and Soft Drinks
3:30-4:00	Student Tracking Enrollment Model (STEM): A Procedure for Quarter-by-Quarter Enrollment Projections - J. F. Burns, University of Florida
4:00-4:30	Selection of Academic Majors: A Comparative Study of Native and Transfer Students - T. Lightfield and D. Rice, Florida State University
4:30-5:00	Round Table Discussion of Above Papers
7:30-9:00	Banquet and Address: "Educational Funding: Adequate and Equitable" by the Honorable Terrell Sessums, Speaker of the Florida House of Representatives

Friday, June 29,1973

Morning

7:30-8:30	Planning Committee Breakfast
8:30-9:00	Definitions of Faculty Effort Categories or What is "Instruction" Anyway? - D. Strenglein, University of South Florida
9:00-9:30	Relationship Between Course Grades and Faculty Evaluation - H. P. Hanson and V. M. Yellen, University of Florida
9:30-10:00	Students' Instructor-Course Evaluation - A Factor Analysis and Multivariate Analysis of Variance Studies - J. O. Howell, Florida Atlantic University
10:00-10:30	Coffee and Rolls
10:30-11:00	An Examination of Recent Trends in Grade Point Averages at Florida State University - T. E. Gusler, Florida State University
11:00-11:30	Current SUS CLEP Policy Practices - D. R. Coleman, Florida Technological University
11:30-12:00	Implications for Institutional Research and Planning of Inter-Institutional Course Registration Articulation Agreements - T. W. Keene, University of South Florida
12:00-12:30	Round Table Discussion of Above Papers
12:30-1:00	Conference Evaluation and Wrap-up
1:00	Adjournment

PLANNING COMMITTEE

George Barton
Nova University

Dennis Goodwin
University of South Florida

Arcnie Johnston
Tallahassee Community College

Norris Miner
Seminole Community College

Edward Cottrell
St. Petersburg Community College

The Committee wishes to express its heartfelt appreciation to all those who served so well without public recognition. Our thanks to all participants on both sides of the speaker's rostrum and to their families whose attendance brightened the meetings. During the coming year, "May you seek not to know all the answers, but only to understand the questions" and may we see you all again safely here in our company in 1975.

Archie B. Johnston
Committee Chairman

THE CONCEPT AND IMPLEMENTATION OF THE UNIVERSITY OF GEORGIA COURSE CONTRIBUTION MATRIX

by

A. A. Sterns

and

Fred H. Wise

THE CONCEPT AND IMPLEMENTATION OF THE UNIVERSITY OF GEORGIA COURSE CONTRIBUTION MATRIX

A. A. Sterns

Fred H. Wise

CCM - AN OUTCROP OF UGA -- PPBS

The University of Georgia approach to the development of an integrated system of Planning, Programming and Budgeting differs basically from systems which have been developed so far or have been implemented in various governmental or institutional environments. The emphasis in the Georgia System has been on analysis which provides relevant information to managers and planners. To-date we have not expended large amounts of resources on simulation models for predicting future resource requirements. Other organizations are undertaking extensive development and testing of this useful planning tool and we plan to utilize their results as found appropriate to our needs. The University of Georgia approach has concentrated on program definition in terms of inputs, attributes, content, costs and outputs. The Course Contribution Matrix or CCM is one of the analytical tools designed for this purpose and will be the major topic of this paper. This orientation is not designed to downgrade the role of simulation but simply indicates our belief that simulation can be meaningful as a planning tool only when the interaction of relevant information is known and understood.

The Georgia System accepts the existing organizational units of college, school and department. The System does not superimpose a program management structure over the existing organizational units as has been attempted by some agencies and institutions. The system recognizes the existing organizational units as representing both management of process and management of activities. Further, the department is accepted as the basic management unit of the academic disciplines. The department as an organizational unit is not only compatible with the Georgia integrated PPBS but becomes the basic management unit within it.

Also the Georgia System accepts the traditional budgetary line items as representing the items of input-cost

which must be well-managed by the department as the basic organizational unit. However, through a system of well-defined "cross-walks" the system relates this "input-cost" to well defined output oriented programs. As full implementation of the system is realized, the cost of these programs becomes the unit for which money is appropriated, or, if a governmental mediator such as a Board of Regents exists, the cost becomes the unit to which moneys are allotted.

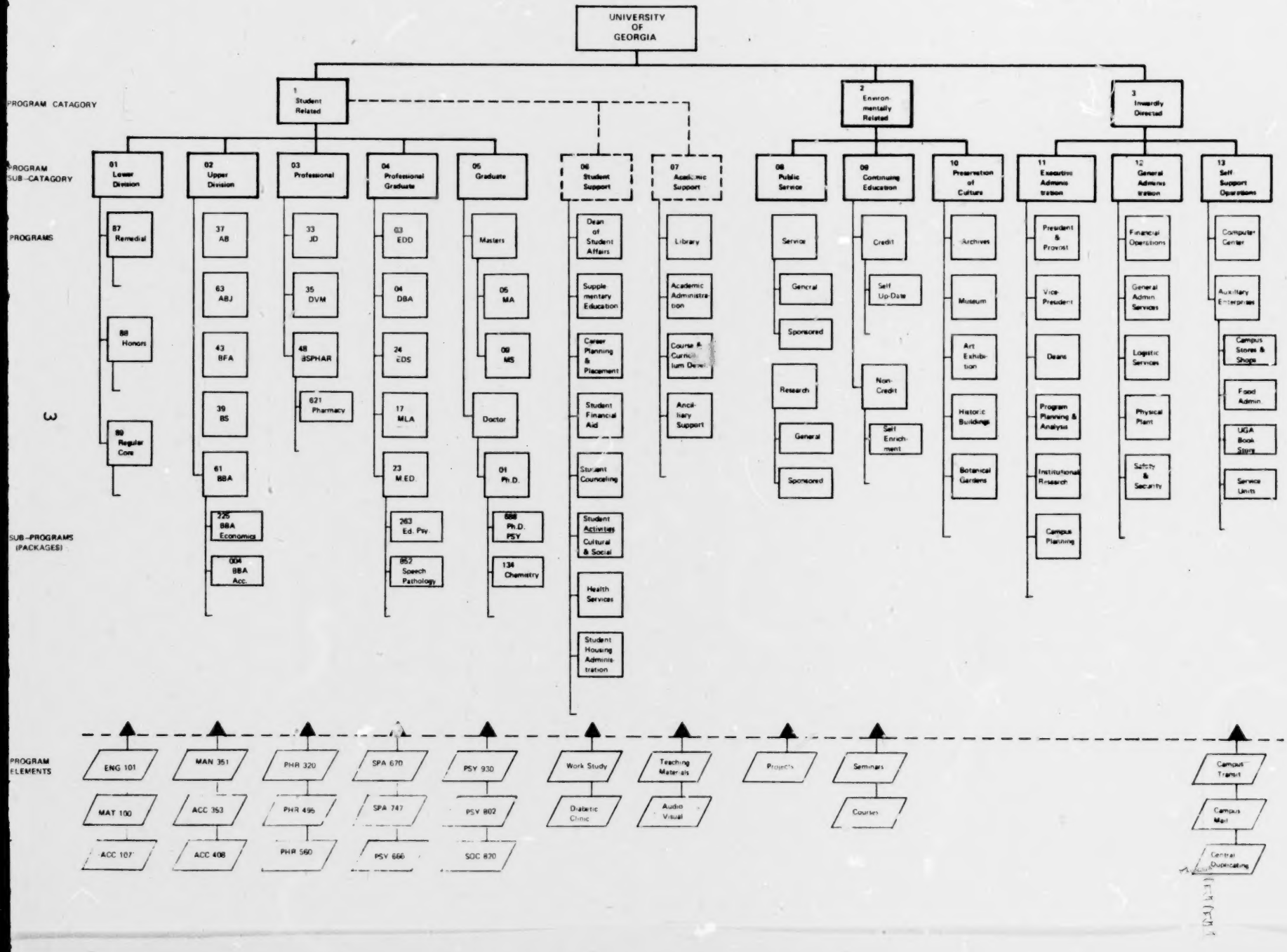
The program structure of the University of Georgia is a well-defined output category structure and not an "activity" structure as prescribed by NCHEMS. The chart on the next page provides an illustration of Georgia's program structure. Programs are classified into three major categories: Student Related, Environmentally Related and Inwardly Directed. A detailed discussion of this structure could be the subject of another paper, therefore, we will simply draw your attention to the programs categorized as Student Related, subclassifications of Instruction, Student Support, and Academic Support. Within the instructional category we find the individual instructional programs which are defined as the various degree-major combinations. From undergraduate to graduate and professional there are 425 identified degree-major combinations at the University of Georgia.

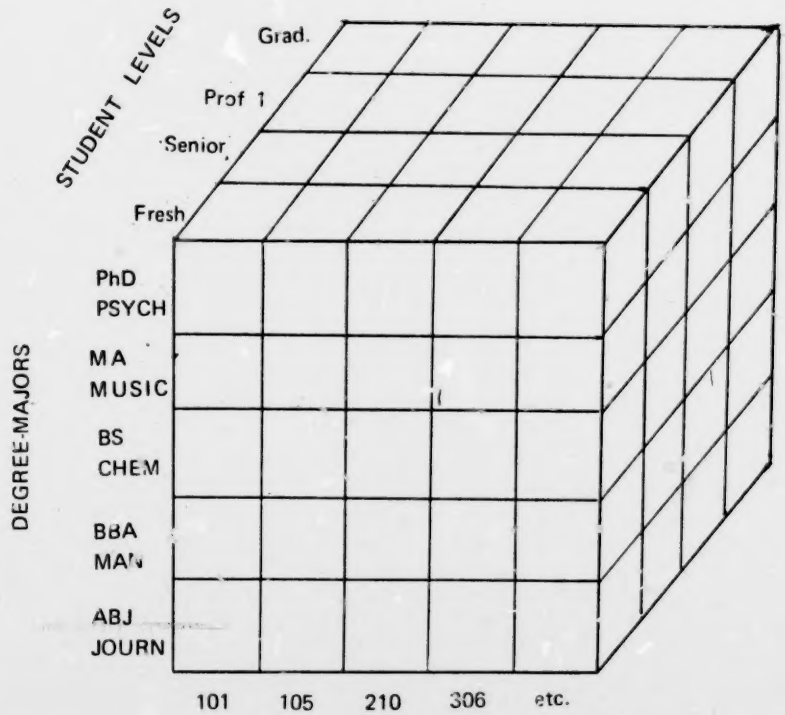
THE CONCEPT

Since the instructional course is the basic activity within a "discipline" structure as well as within the "activity" structure the interconnecting link can only be established by the identification of the contributions of such instructional unit to the output category. The output category at Georgia is the degree-major combination. For the purpose of determining the interconnecting links we have developed software to display what we call the Course Contribution Matrix or the CCM. This matrix reveals which courses are taken by students enrolled in a particular degree-major during an academic quarter, semester or year if desired and how many credit hours from each course are consumed by each degree-major group.

The matrix itself is relatively simple and not too different in structure from that used by NCHEMS in their Induced Workload Matrix (IWLM). However, the data used and the software is quite different as is the output. In the NCHEMS model the individual course loses its identity while in the CCM this identity is preserved for analytical purposes.

PROGRAM STRUCTURE





The diagram above illustrates the arrangement of the basic data elements in the Course Contribution Matrix. One matrix of this design is developed by means of computer software for each discipline. Individual courses taught by a single discipline are arranged along the base of the matrix. Along the vertical are the degree-majors enrolled in one or more of these courses. Along the thirs dimension of the matrix we have the student levels. The course numbers inherently provide the instruction level of each course. The source of all of the above data is the Student Master File. The data entered in each cell of the matrix are student credit hours (SCH).

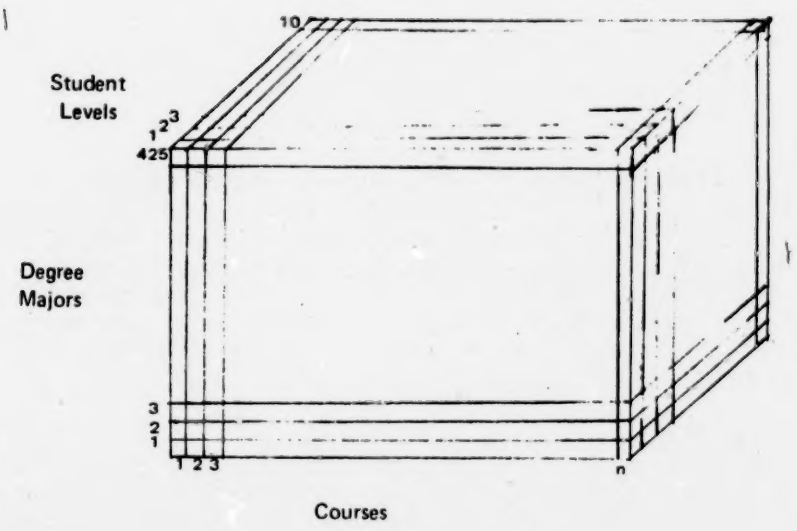
Thus, the Course Contribution Matrix (CCM) is a three-dimensional 10 x 425 x n Matrix. There are 10 student levels (actually only nine are presently in use at the University of Georgia. Freshman, Sophomore, Junior, Senior Graduate, and four levels of Professional). There are 425 different degree-major combinations and "n" number of courses for each discipline (a separate CCM for each discipline is to be constructed).

In addition, the "n" courses are divided into five levels of instruction. Courses 100-199 constitute the Lower Level, 200-599 the Upper Level, and 600-999 the Graduate Level. For the Schools of Law, Pharmacy, and Veterinary Medicine, there is a Professional Level, and for Education a Professional Graduate Level, where the course numbers overlap with the Upper and Graduate Levels.

For any one particular discipline very little of the matrix will be used, for most disciplines will contribute to only a few of the 425 degree-majors and to only the first five student levels. Certain Graduate courses in some disciplines may contribute to only one or two degree-majors.

Certain other disciplines like English and History, on the other hand, may contribute to almost all of the 425 degree majors since some courses in those disciplines are required University-wide. Those particular CCMs will thus contain much more data.

Immediately following is a depiction of the three-dimensional CCM matrix and mathematical formulas for all the CCM outputs. These outputs are divided into three categories: Individual Course Output, Discipline Output, and Department Output.



Let S_i = Student Level where i = 1 . . . 10

Let D_j = Degree Majors where j = 1 . . . 425

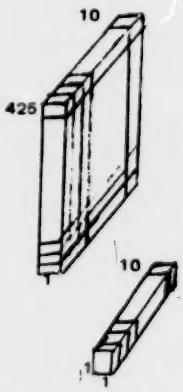
Let C_k = Courses where k = 1 . . . n and varies for each discipline

Let I_l = Instruction Level where l = 1 . . . 5 and

Courses 100 – 199 = Lower Level (I_1)

Courses 200 – 599 = Upper Level (I_2)

Etc.



I. Individual Course Output.

1. Total Course SCH Production

$$C_1 \Sigma \Sigma S_i D_j$$

2. Total Course Contribution to Degree-Major

$$C_1 D_1 \Sigma S_i$$

3. Percent of Course SCH Production Consumed by each Degree-Major

$$C_1 D_1 \Sigma S_i / C_1 \Sigma \Sigma S_i D_j$$

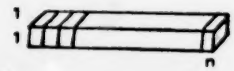
4. Total Course SCH Production by Student Level

$$C_1 S_1 \Sigma D_j$$

II. Discipline Output

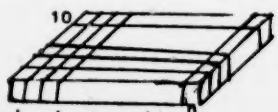
5. Total Discipline SCH Contribution to Degree-Major, by Student Level

$D_1 S_1 \Sigma C_k$



6. Total Discipline SCH Contribution to Degree-Major

$D_1 \Sigma \Sigma S_i C_k$

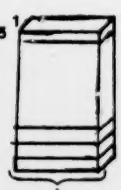


7. Total Discipline SCH Contribution to Degree-Major by Instruction Level, by Student Level

$D_1 S_1 I_1$

8. Total Discipline SCH Production by Instruction Level, by Student Level

$I_1 S_1 \Sigma D_j$



III. Department Output (where there is more than one discipline). Assume disciplines A and B.

9. Total Department SCH Contribution to Degree-Major

$(D_1 \Sigma \Sigma S_i C_k)_A + (D_1 \Sigma \Sigma S_i C_K)_B$

10. Total Department SCH Production by Instruction Level, by Student Level

$(I_1 S_1 \Sigma D_j)_A + (I_1 S_1 \Sigma D_j)_B$

11. Total Department SCH Contribution to Degree-Major by Instruction Level, by Student Level

$(D_1 S_1 I_1)_A + (D_1 S_1 I_1)_B$

12. Total Department SCH Production by Instruction Level

$(I_1 \Sigma \Sigma S_i D_j)_A + (I_1 \Sigma \Sigma S_i D_j)_B$

13. Total Department SCH Production

$(\Sigma \Sigma \Sigma S_i D_j I_1)_A + (\Sigma \Sigma \Sigma S_i D_j I_1)_B$

THE SOFTWARE AND COMPUTER OUTPUTS

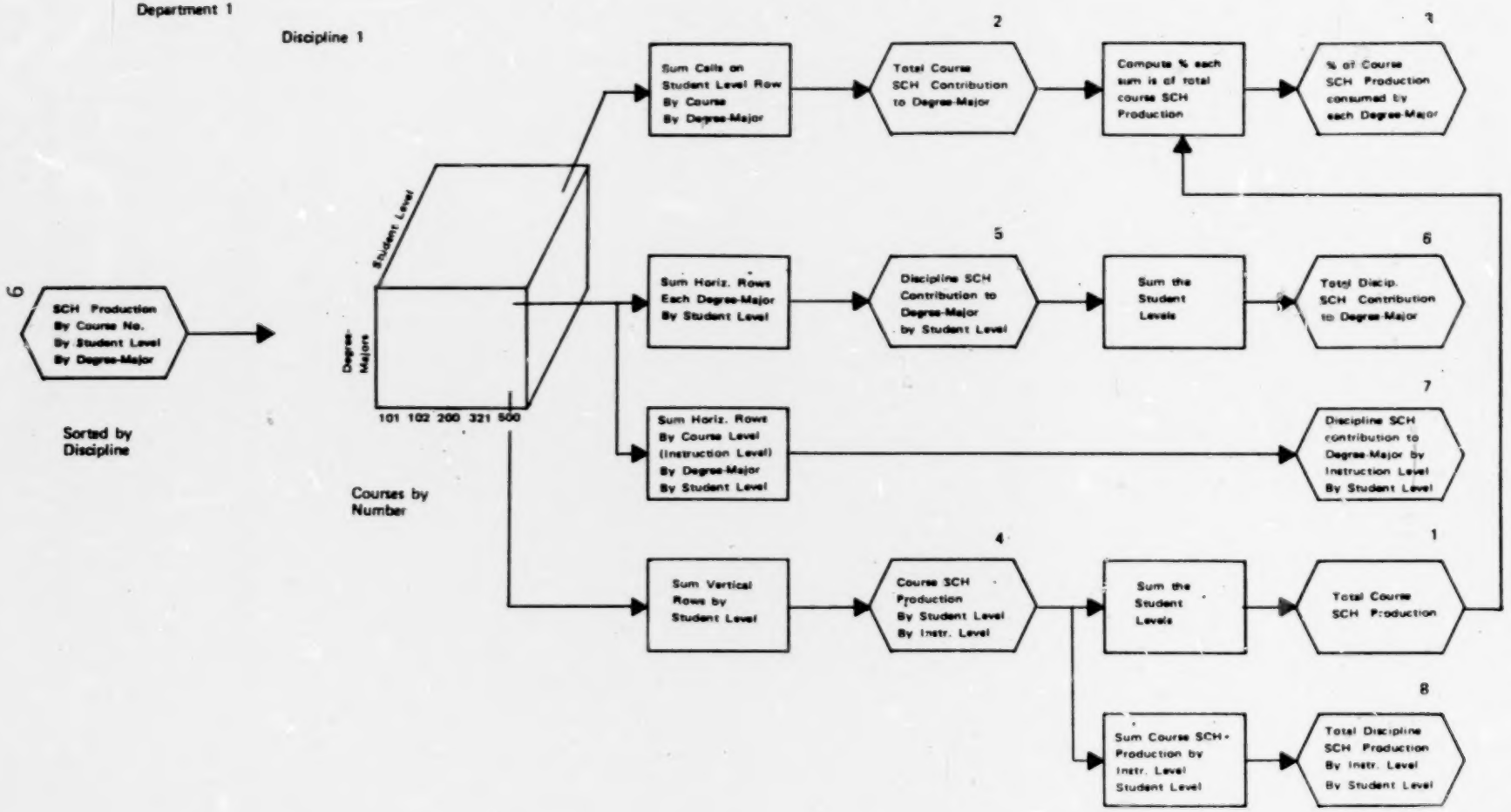
The software is designed to build a single matrix for each discipline from the data found in the Student Master file. The discipline in each case is identified by the alpha prefix of the course number. A search, sort and post routine is used to identify the degree-major and the student level of each student taking each course. While the process of building the individual matrices is quite simple the problem encountered is one of volume. With approximately 300 courses as the maximum taught by any one discipline, 425 possible degree-major combinations and 9 student levels a matrix for just one discipline could conceivably be 300 X 425 X 9. In addition at Georgia we must consider a total of 130 disciplines and thus 130 matrices. One of the breakthroughs we have made is the ability to build, process, and externally store all of these matrices while not exceeding 200 K of core.

Information is generated and drawn from the various matrices primarily by summing matrix vectors. This is illustrated diagramatically on the next page. By summing the cells in a row for student level, for example, we obtain total course SCH contribution to a degree-major. By summing horizontal rows we obtain the total discipline SCH contribution to a degree-major by student level. Summing the vertical rows by student level provides course SCH production by student level and also by instruction level.

Study of the second diagram will show that through additional processing (see next chart) of the above described basic information a number of very useful reports can be generated. For example, taking the course SCH production by student level and instruction level we could further sum by student level and obtain total course SCH production. This is useful information by itself but is also the basis for computing the percentage of course SCH production consumed by each degree-major. By following the diagram the reader can see the information potential of further processing.

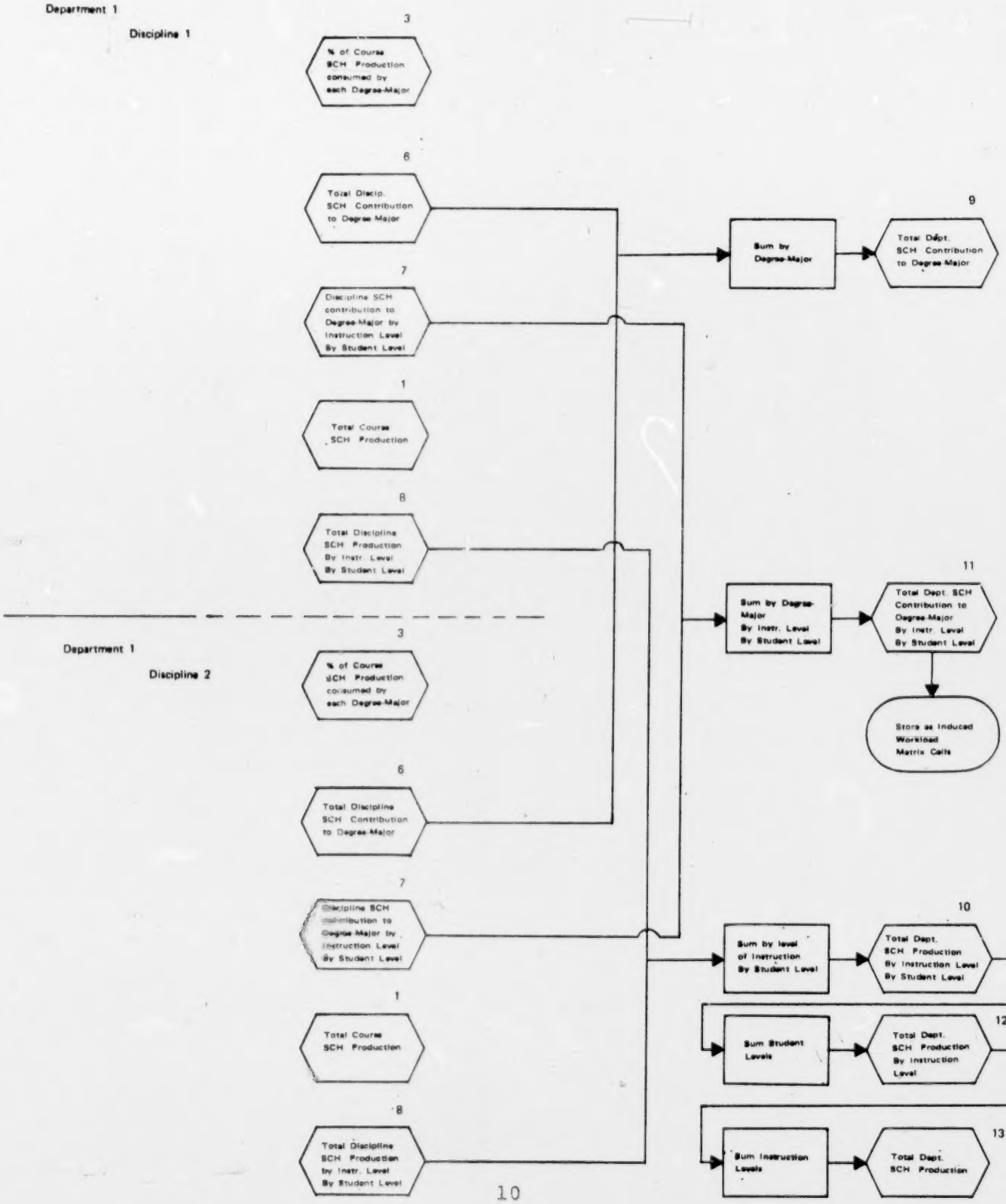
COURSE CONTRIBUTION MATRIX
BY DISCIPLINE OR DEPARTMENT

(DISCIPLINE TOTALS)


Department 1
Discipline 1
6
SCH Production By Course No. By Student Level By Degree-Major
Sorted by Discipline
Student Level
Degree-Majors
101 102 200 321 500
Courses by Number
Sum Cells on Student Level Row By Course By Degree-Major
2
Total Course SCH Contribution to Degree-Major
Compute % each sum is of total course SCH Production
% of Course SCH Production consumed by each Degree-Major
Sum Horiz. Rows Each Degree-Major By Student Level
5
Discipline SCH Contribution to Degree-Major by Student Level
Sum the Student Levels
6
Total Discip. SCH Contribution to Degree-Major
Sum Horiz. Rows By Course Level (Instruction Level) By Degree-Major By Student Level
7
Discipline SCH contribution to Degree-Major by Instruction Level By Student Level
Sum Vertical Rows by Student Level
4
Course SCH Production By Student Level By Instr. Level
Sum the Student Levels
1
Total Course SCH Production
8
Sum Course SCH Production by Instr. Level Student Level
Total Discipline SCH Production By Instr. Level By Student Level

COURSE CONTRIBUTION MATRIX
BY DISCIPLINE OR DEPARTMENT

(DEPARTMENT TOTALS)


Department 1
Discipline 1
3
% of Course SCH Production consumed by each Degree-Major
6
Total Discip. SCH Contribution to Degree Major
7
Discipline SCH contribution to Degree-Major by Instruction Level By Student Level
1
Total Course SCH Production
8
Total Discipline SCH Production By Instr. Level By Student Level
Sum by Degree-Major
9
Total Dept. SCH Contribution to Degree-Major
Department 1
Discipline 2
3
% of Course SCH Production consumed by each Degree-Major
6
Total Discipline SCH Contribution to Degree-Major
7
Discipline SCH contribution to Degree-Major by Instruction Level By Student Level
1
Total Course SCH Production
8
Total Discipline SCH Production by Instr. Level By Student Level
Sum by Degree-Major By Instr. Level By Student Level
11
Total Dept. SCH Contribution to Degree-Major By Instr. Level By Student Level
Store as Induced Workload Matrix Cells
Sum by level of Instruction By Student Level
10
Total Dept. SCH Production By Instruction Level By Student Level
Sum Student Levels
12
Total Dept. SCH Production By Instruction Level
Sum Instruction Levels
13
Total Dept. SCH Production

The Information from the CCM currently identified as being useful for deans, department heads, faculty and planners is listed below. It is quite possible as we proceed with implementation of the system some of this information may be found to be of little use. If this is the case a simple card input to the software will suppress the unnecessary report.

AVAILABLE CCM OUTPUTS

1. Total course SCH Production 2. Total Course SCH Contribution to Degree-Major 3. Percent of course SCH Production Consumed by each Degree-Major 4. Total Course SCH Production by Student Level	Individual Course Output
5. Total Discipline SCH Contribution to Degree-Major, by Student Level 6. Total Discipline SCH Contribution to Degree-Major 7. Total Discipline SCH Contribution to Degree-Major, by Instruction Level 8. Total Discipline SCH Production by Instruction Level, by Student Level	Discipline Output
9. Total Department SCH Contribution to Degree-Major 10. Total Department SCH Production by Instructional Level, by Student Level 11.*Total Department SCH Contribution to Degree-Major by Instruction Level, by Student Level 12. Total Department SCH Production by Instruction Level 13. Total Department SCH Production	Department Output

* Input to NCHEMS Induced Workload Matrix

It should be noted that information item eleven on the list is, in fact, the basic input for the NCHEMS IWLM should the institution desire to proceed with the Resource Requirements Prediction Model.

While the Course Contribution information will be provided to faculty, department heads, and deans in summary form it is quite interesting to look at the matrix printout itself. Printing out the entire matrix is a monumental task and is not something one would do each quarter. The volume of paper is tremendous. For the University of Georgia we ended up with a stack of printout three and one-half feet high. When this stack is broken down into departments it becomes more manageable but is still a lot of papers. The summary reports are very easily handled and provide all the necessary detail. Let's take a brief look at the matrix structure in the printout and we think you will see how the data is actually organized in the file.

The first printout illustrated on the next page provides an analysis of an individual course production. Biology 101 is primarily a service course therefore the list of degree-majors it contributes to is long. On the left we see the alpha code for degree and the three-digit code of each major. Across the top are the student levels of freshmen, sophomore, junior, senior, graduate, professional levels 1, 2, 3, 4 and column 10 is presently unused. On the right side we have the total SCH consumed by degree-major and percentage that is of the total course production. Total course production is shown at the bottom right corner and totals are available for each student level.

An analysis of this matrix very quickly provides useful information. We can quickly identify the prime users of this course as pre-med, pre-vet. and pre-dent. Combined, these prime users consume 28% of the total production. The remainder of the SCH production is well-scattered among the various degree-majors. We can say that this course is primarily a service course. Totals by student level show this course to be primarily a freshman course but some production even being consumed by graduate students. The last few entries also show some data-base problems in that degree objective is not stated for a number of students.

The second printout shows the contributions of various disciplines and departments to a specific degree-major combination (in our illustration AB-Psychology). This is shown by student level and instruction level.

02/25/73 COURSE BID 101 ENROLLMENT BY DEGREE-MAJOR AND STUDENT LEVEL PAGE 277
FALL QUARTER, 1972

DEGREE MAJORS			STUDENT LEVELS											
			1	2	3	4	5	6	7	8	9	10	TOTAL	PERCENT
MS	562		30	5	0	0	0	0	0	0	0	0	35	0.012
MS	579		35	5	0	0	0	0	0	0	0	0	40	0.013
MS	588		5	0	0	0	0	0	0	0	0	0	5	0.002
MS	621		0	5	10	0	0	0	0	0	0	0	15	0.005
MS	676	Pre Med	275	45	20	5	0	0	0	0	0	0	345	0.116
MS	684	Prevet	225	0	5	0	0	0	0	0	0	0	230	0.077
MS	688		5	10	0	0	0	0	0	0	0	0	15	0.005
MS	882		60	20	10	5	0	0	0	0	0	0	95	0.032
MS	883	Pre Dent	120	5	0	0	0	0	0	0	0	0	125	0.042
MS	884		80	0	0	0	0	0	0	0	0	0	80	0.027
MS	885		35	0	0	0	0	0	0	0	0	0	35	0.012
MS	887		45	10	0	0	0	0	0	0	0	0	55	0.019
MS	888		15	0	0	0	0	0	0	0	0	0	15	0.005
MS	995		95	5	0	0	0	0	0	0	0	0	100	0.034
MS	997		15	10	0	0	0	0	0	0	0	0	25	0.008
MSA	026		5	5	0	0	0	0	0	0	0	0	10	0.003
MSA	079		10	0	5	0	0	0	0	0	0	0	15	0.005
MSA	114		5	0	0	0	0	0	0	0	0	0	5	0.002
MSA	292		5	0	0	0	0	0	0	0	0	0	5	0.002
MSA	344		5	0	0	0	0	0	0	0	0	0	5	0.002
MSA	428		5	0	0	0	0	0	0	0	0	0	5	0.002
MSA	684	Pre Vet	165	15	5	0	0	0	0	0	0	0	185	0.062
MSA	995		10	0	0	0	0	0	0	0	0	0	10	0.003
MSED	096		0	5	0	5	0	0	0	0	0	0	10	0.003
MSED	130		5	0	0	0	0	0	0	0	0	0	10	0.003
MSED	222		20	0	5	0	0	0	0	0	0	0	5	0.002
MSED	277		40	15	20	0	0	0	0	0	0	0	25	0.008
MSED	285		5	5	0	0	0	0	0	0	0	0	75	0.025
MSED	359		0	5	0	0	0	0	0	0	0	0	10	0.003
MSED	565		0	0	5	0	0	0	0	0	0	0	5	0.002
MSED	581		15	10	5	0	0	0	0	0	0	0	5	0.002
MSED	592		5	0	0	0	0	0	0	0	0	0	30	0.010
MSED	634		55	10	0	0	0	0	0	0	0	0	5	0.002
MSED	679		5	0	0	0	0	0	0	0	0	0	65	0.022
MSED	688		0	0	5	0	0	0	0	0	0	0	5	0.002
MSED	709		0	0	0	10	0	0	0	0	0	0	5	0.002
MSLD	774		5	0	0	0	0	0	0	0	0	0	10	0.003
MSPD	781		20	0	0	0	0	0	0	0	0	0	5	0.002
MSLD	785		5	0	0	0	0	0	0	0	0	0	20	0.007
MSED	789		0	0	5	0	0	0	0	0	0	0	5	0.002
MSED	832		5	0	0	0	0	0	0	0	0	0	5	0.002
MSED	835		0	0	5	0	0	0	0	0	0	0	5	0.002
MSED	852		10	20	5	5	0	0	0	0	0	0	5	0.002
MSED	883		5	0	0	0	0	0	0	0	0	0	40	0.013
MSED	888		5	0	0	0	0	0	0	0	0	0	5	0.002
MSED	995		25	0	0	0	0	0	0	0	0	0	5	0.002
MSED	997		0	0	5	0	0	0	0	0	0	0	25	0.008
MSED	999		30	0	0	0	0	0	0	0	0	0	5	0.002
MSPA	354		5	0	0	0	0	0	0	0	0	0	30	0.010
MSHE	135		5	0	0	0	0	0	0	0	0	0	5	0.002
MSHE	222		5	0	0	0	0	0	0	0	0	0	5	0.002

02/25/73 COURSE BID 101 ENROLLMENT BY DEGREE-MAJOR AND STUDENT LEVEL PAGE 278
FALL QUARTER, 1972

DEGREE MAJORS			STUDENT LEVELS											
			1	2	3	4	5	6	7	8	9	10	TOTAL	PERCENT
MSHE	995		5	0	0	0	0	0	0	0	0	0	5	0.002
JD	499		0	0	0	0	0	0	0	0	0	0	5	0.002
ND	997		0	0	0	5	0	0	0	0	0	0	5	0.002
NG	352		15	0	0	0	0	0	0	0	0	0	15	0.005
NG	390		0	0	0	0	0	0	0	0	0	0	5	0.002
NG	562		5	0	0	0	0	0	0	0	0	0	5	0.002
NG	596		5	0	0	0	0	0	0	0	0	0	5	0.002
NG	688		10	0	0	0	0	0	0	0	0	0	10	0.003
NG	835		5	0	0	0	0	0	0	0	0	0	5	0.002
NG	840		5	0	0	0	0	0	0	0	0	0	5	0.002
NG	995		15	0	0	0	0	0	0	0	0	0	15	0.005
NG	997		30	25	0	0	0	0	0	0	0	0	55	0.019
TOTAL			2270	410	205	75	5	0	0	5	0	0	2970	1.009

02/25/73 DISCIPLINE ART--DEPARTMENT ART SCH CONTRIBUTION TO DEGREE-MAJOR AB - PSYCHOLOGY PAGE 642

FALL QUARTER, 1972

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	5	0	5	0	0	0	0	0	0	0	10
S	2	15	28	5	0	0	0	0	0	0	0	48
T L	3	0	0	0	0	0	0	0	0	0	0	0
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C P	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
A	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		20	28	10	0	0	0	0	0	0	0	58

02/25/73 DISCIPLINE FA --DEPARTMENT ART SCH CONTRIBUTION TO DEGREE-MAJOR AB - PSYCHOLOGY PAGE 642

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	0	0	0	0	0	0	0	0	0	0	0
S	2	10	35	40	5	0	0	0	0	0	0	90
T L	3	0	0	0	0	0	0	0	0	0	0	0
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C P	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
A	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		10	35	40	5	0	0	0	0	0	0	90

02/25/73 DEPARTMENT ART SCH CONTRIBUTION TO DEGREE-MAJOR AB - PSYCHOLOGY PAGE 642

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	5	0	5	0	0	0	0	0	0	0	10
S	2	25	63	45	5	0	0	0	0	0	0	138
T L	3	0	0	0	0	0	0	0	0	0	0	0
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C P	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
A	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		30	63	50	5	0	0	0	0	0	0	148

02/25/73 DISCIPLINE BIC--DEPARTMENT BIOLOGICAL SCIENCES SCH CONTRIBUTION TO DEGREE-MAJOR AB - PSYCHOLOGY PAGE 643

FALL QUARTER, 1972

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	55	45	45	5	0	0	0	0	0	0	150
S	2	0	0	0	0	0	0	0	0	0	0	0
T L	3	0	0	0	0	0	0	0	0	0	0	0
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C P	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
A	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		55	45	45	5	0	0	0	0	0	0	150

DEPARTMENT TOTALS SAME AS DISCIPLINE TOTALS ABOVE

The next printout shows an analysis of instruction level within each discipline and within the total department. We can immediately see that we have a fairly large number of senior level students taking 200 level courses in SOC and a large number of graduate students taking 300 level courses. The reasons for this might well be the subject of more intensive analysis. We also can see a substantial number of Juniors and Seniors taking 100 level courses. Surely a department head and/or his faculty would be interested in learning why.

We will have to leave it to your judgement whether this type of information would be useful in your institution. We should point out that what we have just viewed is simply a printout of the matrix as it is stored. Summary reports and further analysis is accomplished by extracting data from this data-base for formatting into reports or manipulation by additional software for analysis.

THE IMPACT OF THE CCM

Where do we go from here? We believe that information generated from the CCM can provide a major input to our curriculum management system now under development. Two outputs from the CCM can be used to generate a course production utility factor. Combined with the other inputs to the curriculum committee shown on the chart on the next page this factor can be very meaningful. Our proposal for a Curriculum Management System has been explored with our Vice President for Instruction and our Curriculum Committee. They are all quite enthused about the possibility of access to information never before available to them. The subject of the role of institutional research in curriculum management could be another whole paper, so we will not dwell on it now.

THE STANDARD CURRICULUM

Just briefly, we would like to say that we are contemplating moving toward developing a Standard Curriculum (for comparative and decision-making purposes only) and interconnecting such a Standard Curriculum ("STACUM") with Standard Cost.

2/25/73 ANALYSIS OF INSTRUCTIONAL LEVEL AND STUDENT LEVEL WITHIN DISCIPLINE SOC OF DEPARTMENT SOCIOLOGY PAGE
FALL QUARTER, 1972

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	2420	940	330	90	5	0	0	10	0	0	3795
S	2	170	390	945	1485	0	0	0	10	0	0	3000
T L	3	0	0	0	0	1140	0	0	0	0	0	1140
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C E	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
N	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		2590	1330	1275	1575	1145	0	0	20	0	0	7935

2/25/73 ANALYSIS OF INSTRUCTIONAL LEVEL AND STUDENT LEVEL WITHIN DISCIPLINE SOS OF DEPARTMENT SOCIOLOGY PAGE

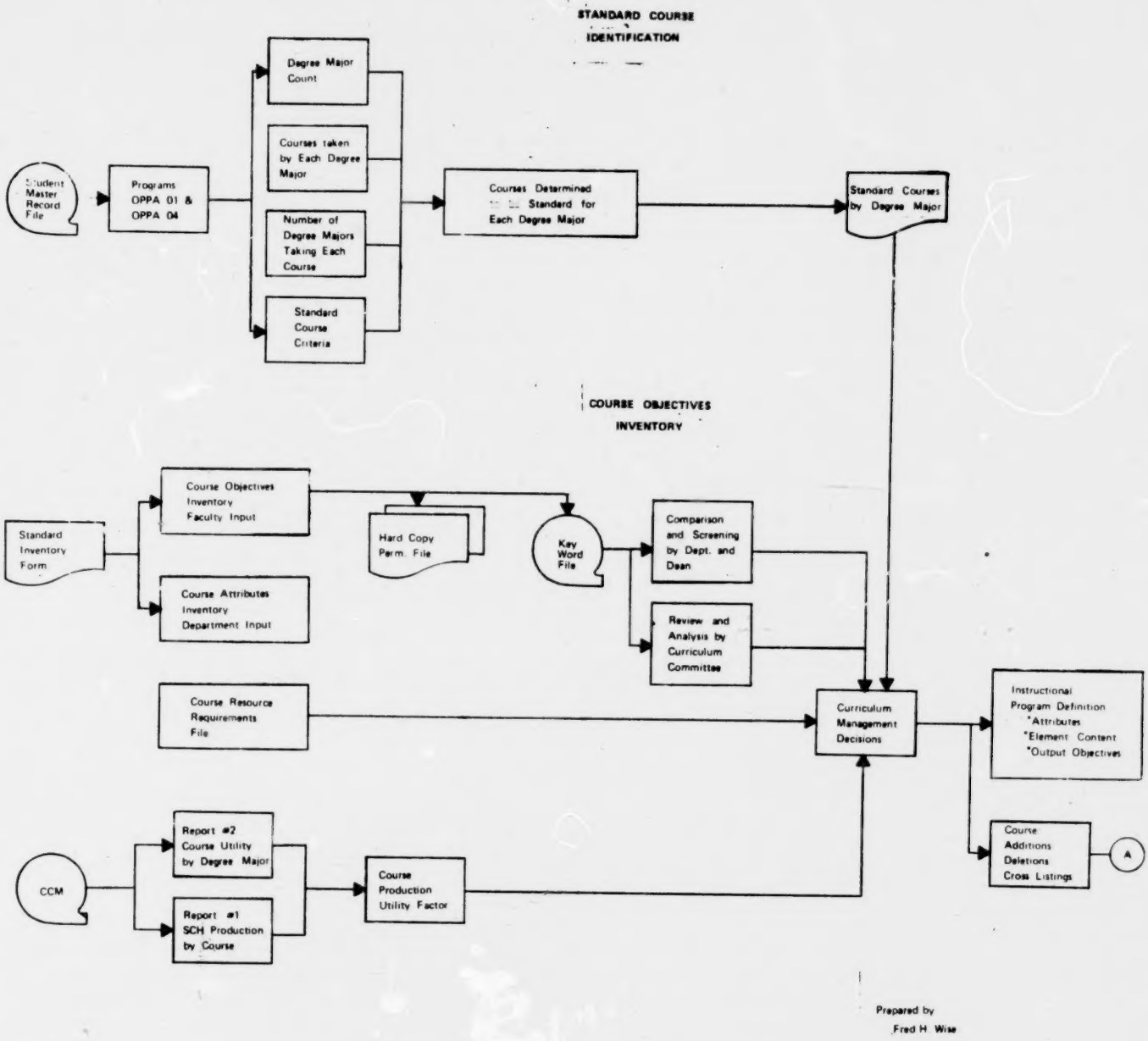
STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	95	99	75	145	0	0	0	10	0	0	420
S	2	0	1	14	11	0	0	0	0	0	0	30
T L	3	0	0	0	0	0	0	0	0	0	0	0
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C E	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
N	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		95	98	89	156	0	0	0	10	0	0	450

2/25/73 ANALYSIS OF INSTRUCTIONAL LEVEL AND STUDENT LEVEL WITHIN DEPARTMENT SOCIOLOGY PAGE

STUDENT LEVELS

I		1	2	3	4	5	6	7	8	9	10	TOTAL
N	1	2515	999	405	235	9	0	0	20	0	0	4175
S	2	170	391	959	1498	0	0	0	10	0	0	3030
T L	3	0	0	0	0	1140	0	0	0	0	0	1140
R E	4	0	0	0	0	0	0	0	0	0	0	0
L V	5	0	0	0	0	0	0	0	0	0	0	0
C E	6	0	0	0	0	0	0	0	0	0	0	0
T L	7	0	0	0	0	0	0	0	0	0	0	0
I S	8	0	0	0	0	0	0	0	0	0	0	0
C	9	0	0	0	0	0	0	0	0	0	0	0
N	10	0	0	0	0	0	0	0	0	0	0	0
TOTAL		2685	1388	1364	1733	1149	0	0	30	0	0	8345


STANDARD COURSE IDENTIFICATION
Student Master Record File
Programs OPPA 01 & OPPA 04
Degree Major Count
Courses taken by Each Degree Major
Number of Degree Majors Taking Each Course
Standard Course Criteria
Courses Determined to be Standard for Each Degree Major
Standard Courses by Degree Major
COURSE OBJECTIVES INVENTORY
Standard Inventory Form
Course Objectives Inventory Faculty Input
Course Attributes Inventory Department Input
Hard Copy Perm. File
Key Word File
Comparison and Screening by Dept. and Dean
Review and Analysis by Curriculum Committee
Course Resource Requirements File
Curriculum Management Decisions
Instructional Program Definition
*Attributes
*Element Content
*Output Objectives
Course Additions Deletions Cross Listings
A
CCM
Report #2 Course Utility by Degree Major
Report #1 SCH Production by Course
Course Production Utility Factor
Prepared by
Fred H. Wise

Utilizing the Course Contribution Matrix,we have the capability to identify courses critical to a major/degree combination. What we term "critical", it is admitted, is arbitrary. Out assumption has been that when at least 40% of students within a major enroll in certain courses, these courses become critical for their degree purpose. From empirical observation at the University of Georgia, we found this true for nearly all programs and, in fact, curves plotted for most of the programs were nearly identical. The tabulation on the next page depicts 4123 courses taught in 1971 and and 4303 courses taught in 1973. (Over 8000 courses are listed on the Course Master.) This tabulation relates that in 1972 on the lower level:

7% of all courses produced 40% of all SCH
37% of all courses produced 55% of all SCH and
58% of all courses produced only 5% of all SCH

on the upper level:

4% of all courses produced 40% of all SCH
51% of all courses produced 55% of all SCH and
45% of all courses produced only 5% of all SCH

on the graduate level:

6% of all courses produced 40% of all SCH
61% of all courses produced 55% of all SCH and
33% of all courses produced only 5% of all SCH

on the professional level:

14% of all courses produced 40% of all SCH
56% of all courses produced 55% of all SCH and
30% of all courses produced only 5% of all SCH.

The above delineation as arrived at through the CCM and indicating both structure through institutional requirements and student demand (the student as a consumer) allows us to move toward the system of Curriculum Management. Within such a system, we are developing a subsystem of Standard Curriculum Cost. The evolvement of the Course Contribution Matrix allows for depicting a matrix of "critical courses." As pointed out, our studies have indicated that the behavior of students in any curriculum combination shows little variance; therefore, each curriculum combination is made up of:

UNIVERSITY OF GEORGIA

NUMBER OF COURSES AND SCH'S PRODUCED AT LEVELS OF EDUCATION

(Depicted At Progressive % Level)

	1971						1972					
	At %	SCH	SCH CUMULAT	Courses #	Courses Cum	Average SCH/Course	At %	SCH	SCH CUMULAT	Courses #	Courses CUM	Average SCH/Course
LL												
	40	103,252	103,252	10	10	10,325	40	109,302	109,302	12	12	9,109
	41 – 50	29,944	133,196	4	14	7,486	41 – 50	28,135	137,437	5	17	5,627
	51 – 90	104,828	238,024	40	54	2,621	51 – 90	107,895	245,332	41	58	2,632
	91 – 95	11,820	249,844	14	68	844	91 – 95	13,154	258,486	17	75	774
	96–100	12,818	262,662	95	163	135	96–100	13,290	271,776	103	178	129
UL												
	40	169,102	169,102	55	55	3,075	40	174,230	174,230	65	65	2,680
	41 – 50	42,277	211,379	38	93	1,113	41 – 50	43,286	217,516	46	111	941
	51 – 90	169,099	380,478	578	671	293	51 – 90	174,012	391,528	627	738	278
	91 – 95	21,138	401,616	233	904	91	91 – 95	21,752	413,280	241	979	90
	96–100	21,141	422,757	772	1,676	27	96– 100	21,751	435,031	810	1,789	27
GR. L												
	40	58,169	58,169	129	129	451	40	62,746	62,746	121	121	519
	41 – 50	14,494	72,663	81	210	179	41 – 50	15,554	78,300	78	199	199
	51 – 90	57,923	130,586	858	1,068	68	51 – 90	62,527	140,827	861	1,060	73
	91 – 95	7,254	137,840	277	1,345	26	91 – 95	7,823	148,650	293	1,353	27
	96–100	7,255	145,095	670	2,015	11	96– 100	7,824	156,474	686	2,039	11
PROF												
	40	20,191	20,191	33	33	612	40	23,705	23,705	25	25	948
	41 – 50	5,339	25,530	9	42	593	41 – 50	6,054	29,759	11	36	550
	51 – 90	21,958	47,488	64	106	343	51 – 90	24,191	53,950	66	102	367
	91 – 95	2,477	49,965	16	122	155	91 – 95	3,021	56,971	18	120	168
	96–100	2,629	52,594	52	174	51	96– 100	2,980	59,951	52	172	57
	SUMMARY											
REMEDIAL		16,700	16,700*	95	95	176		16,752	16,752	95	95	176
LOWER LEVEL		262,662	279,362	163	258	1,611		271,776	288,528	178	273	1,527
UPPER LEVEL		422,757	702,119	1,676	1,934	252		435,031	723,559	1,789	2,062	243
GRADUATE		145,095	847,214	2,015	3,949	72		156,474	880,033	2,069	4,131	76
PROFESSIONAL		52,594	899,808	174	4,123	302		59,951	939,984	172	4,303	349
TOTAL		899,808	899,808	4,123	4,123	218		939,984	939,984	4,303	4,303	218

*Guesstimate

(a) the grouping of structure or "critical" courses and that grouping being assumed to be a base for a standard,

(b) a grouping of preferred choice courses determined by accepting an arbitrary percentage of students choice; i.e., 40% of all students within the depicted curriculum combination having taken these groups of courses,

(c) the large group of other courses taken by very few students within each curriculum, the total of which, however, makes up the greatest number of courses and produces the lowest number of Student Credit Hours.

These three groupings can be illustrated as follows:

Course Listing			
ZOO 103 BOT 208	Structured or Critical Courses Taken by 40% of Students and Producing 80% SCH	Base Standard	Curriculum Standard for Degree-Major
ACC 200	Option Choice Taken by 20%-39% of Students and Producing 15% of SCH	Option Standard	
Fine Art 200	Choice of Less than 20% of Students Producing 5% or less of SCH	Curriculum Variance	

The "standard combination" printout from the CCM could be described as the "basic standard"; our present development involves the formulation of a methodology to clearly describe these standards, the implementation of

changes in the standards, and the development of software capability for any institution to quickly insert new basic standards when a new curriculum grouping is adopted. For inter-institution comparison, a standard checklist of curriculum combinations could become a major tool in considering changes and/or new combinations.

While the CCM is the major point of departure for the "Standard Curriculum" (PROJECT STACUM), the development of the cost system at the University of Georgia is the point of departure for developing an "Input Standard Cost" (INSTAC) methodology.

Standard cost per student within each standard curriculum combination is a management tool for analysis of inherent variables of inputs at the discipline level managed by an academic department. The standard cost depends on the arbitrary choice of a student/faculty ratio, often only assumed to result in optimal performance. As variances are recorded in a standard system and as it becomes obvious that the standard is not too reliable, more scientific justifications are sought and the S/F ratio standard is improved. The same thinking applies to the other standards such as Rank/Mix Standard, Rank/Salary Standard, Rank/Level Standard, etc.

Each of the INSTAC variables will affect the cost per student of a specific STACUM. It is proposed that while implementing the developed cost systems at the University of Georgia and after being satisfied with the methodology, new standards will be introduced and tested. After a refined software has proved its capability, such software together with proper instruction could be made available to universities and colleges at large.

A further development interconnected with the formation of Standard Curricula is foreseen in the analysis of course master files. In moving toward a PPB System, we have found the situation at the University of Georgia intolerable, we had little comfort from the fact that a parallel situation exists in most universities and that credible attempts to alleviate that situation, so far, give little encouragement.

In carrying on with the implementation of our system, we will provide the statements of objectives in behavioral terms for each individual course; and we propose as part of the continuing support to analyze systematically these objectives.

CCM RUN COSTS

The following approximate costs associated with running the CCM for one quarter's data not including any costs for producing the Summary Reports include:

	Machine Time	Cost
IBM 360/65 CPU	40 Min.	$290
IBM 1401 Printer (240,000 lines)	7 hrs.	$240
		$170
		$700 approx.

This estimate represents run costs for a quarter's data. Run Costs for a full year's data maker this estimates slightly higher (15%) since additional courses will have been included.

AVAILABILITY TO OTHER INSTITUTIONS

The documentation of the CCM software is now being complete. Some documentation problems relating to machine routines specific to the IBM 360/65 HASP II Operating System have been experienced. Two alternative solutions to these problems are being considered: one, the machine specific routines will be changed, when possible, to be more generally accepted by other computer systems; and two, these routines will be well documented for local modification.

The software and accompanying documentation are public domain since they are funded in part by the Ford Foundation. These programs and documentation will be made available to other institutions at a nominal cost to cover the expense of printing documents and the reproduction of the programs. This Cost has not yet been determined since the documentation is not complete. It is planned that the programs and documentation will be available to other institutions in six months.

AN APPROACH TO IMPROVING COLLEGE CLASSROOM INSTRUCTION THROUGH A TEACHER ACCOUNTABILITY MODEL

BY

Albert B. Smith

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In recent years there has been increasing pressure to provide evaluative data on college teaching; pressure from laymen, legislators, teaching faculty, students, and from college administrators. The major reasons for the pressure seem to be that legislators want information to justify expenditures, laymen want information to justify paying more taxes, teaching faculty want information which will aid them in improving their instruction, students want information to guide them in course and instructor selection and administrators want information to guide them in pay and promotion decisions.

My concern is that few people in higher education are taking time to determine whether or not all this information is in fact changing faculty behavior or improving college curriculum and instruction. Back in 1966, the American Council on Education conducted a study of 1,110 academic deans in a wide range of two-year and four-year colleges. The deans in this survey reported an almost total absence of research on the validity of the special techniques their colleges used for evaluating teacher competence (Gustad, 1966).[1] A second study is needed today to determine whether or not this is still the case. My guess would be that few colleges today are studying the validity, reliability or the effect of their faculty evaluation systems.

Recent research by John A. Centra, a Research Psychologist at the Educational Testing Service, suggests that student ratings may have value in improving college instruction (Centra, 1972)[2]. He concludes his research report, however, by noting that while some changes in teacher behavior in his research were due to student feedback,

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Paper presented at the Sixth Florida Invitational Conference on Institutional Research, Tampa, Florida, June 28, 1973.

they were not of a magnitude or variety to encourage teachers or administrators to rely solely on student ratings for instructional improvement.

I would like to take this opportunity to outline some recent research that we have been conducting in the area of college teaching at the University of Florida. While this has not been institutional research, I do believe it suggests some future directions for institutional research. It also suggests some ways for improving college classroom instruction through a teacher accountability model.

The two research studies which I am about to describe illustrate what I would call "Interaction Research Projects." As an interactionist, I believe that there is no one general theory of instruction but several theories that may be valid for certain students learning certain things in certain learning situations. I would argue that differences in learner characteristics - aptitudes, traits, and interests, and other characteristics - necessitate different teaching approaches if maximum learning is to take place in college teaching. McKeachie, who has long emphasized the importance of interaction in studies of college learning and teaching, presents an excellent review of these types of studies in the 1970 ERIC report titled Research in College Teaching.[3] I would recommend his publication to you if you are interested in conducting interaction research at your college.

According to Cohen and Brawer (1971), the study of teacher/student interaction takes place in many different ways.

> ...Students 'evaluate' the instructor according to their perceptions of him. Thus, the study of student ratings of instructors is, in fact, one type of investigation of interaction. When outsiders visit the classroom and describe the numbers and types of comment made by instructors and students, they too are assessing interaction. A third method of study is observing teacher-student interaction in other than formal classroom situations.[4]

The problem is that we have done very little interaction research of this nature at the college level. (Parlett, 1969; Mann, 1970).[5,6] It seems to me that we must better understand what actually does happen in the college classroom before we can recommend appropriate teacher evaluation or accountability models. It is with these feelings that I became involved in the research projects described here.

TRAINING TEACHING ASSISTANTS

In the Spring of 1971 we conducted a university-wide inservice training program for teaching assistants at the University. One of the purposes of this program was to assist the TA's in the development of effective teaching styles. Fifteen teaching assistants participated in our first program.

I would like to report on one aspect of the program that I feel has significant implications for a teacher accountability model and inservice staff development programs in our state. That aspect is the use of classroom observational systems and modularized instruction for developing specific teaching skills. Both of these instructional methods were used in our program in an attempt to get new college teachers to explore the use of effective questioning and discussion techniques in their classrooms. Over a period of one month and through the utilization of two pre and post video-tape recordings, we found a marked change in our teaching assistants' classroom behavior.

Early in the project it was decided that we should concentrate our efforts on the training of teaching assistants to use one or two new instructional strategies effectively. We felt that if a TA could learn one new teaching skill and use it in his teaching with confidence, then we would have accomplished a great deal in a short period of time. The skill we chose was the ability to ask probing questions in a classroom setting. The State of Florida Department of Education under the Education Professions Development Act had already developed an instructional module for elementary and secondary school teacher education programs on this topic.[7] We rewrote this module adapting it for college teachers.

In order to measure the success of our module, we had each teaching assistant video-taped for ten minutes at the beginning and end of the project. For the first taping, which lasted for ten minutes, we asked the 15 participants to conduct a classroom discussion using their best discussion techniques. Our directions for the second taping were more specific. We asked the students to read the module and then conduct a ten minute discussion using the five questioning skills identified in the module. The five skills were as follows:

1. Rephrase or redirect the same question to another student.
2. Require student to rationally justify his response.
3. Use why, how, explain, interpret or do you agree, to help stimulate thought.
4. Structure the lesson around a single topic.
5. Ask a sequence of five or six pivotal questions on a single topic.

Two graduate students were then trained in the use of the Reciprocal Category System, a classroom observational system originally developed by Robert Flanders and revised for use in recent Florida studies of the verbal behavior of classroom teachers.[8] These observers were then able to take each of the 30 video-tapes and record the type of teaching assistant or student verbal behavior. Every three seconds the observers recorded a number which represented one of the following ten categories of teacher or student verbal behavior: 1) "warms" (informalizes) the climate, 2) accepts (positive reinforcement), 3) amplifies the contributions of another, 4) elicits (asks a question), 5) responds (direct answer a question), 6) initiates (presents information), 7) directs (gives directions), 8) corrects 9) "cools" (formalizes the climate and 10) silence or confusion. Verbal behavior profiles were then developed which showed the percentage of classroom time devoted to these 10 types of teacher or student behavior both before and after the teaching assistant's use of our module on probing questions. Changes in these verbal interaction profiles suggest that the program materials were successful in getting the new teachers to increase their questioning behavior.

For example, we found substantial increases in the amount of time that the TA's devoted to asking questions of their students. Table I below shows the changes in the percentages of time spent on this activity by each of the participants.

TABLE I

Percentage of Each Ten Minutes Teaching Assistants Devote to "Question Asking" Both Before and After Programmed Instruction.*

Teaching Assistant	First Taping %	Second Taping %	Percentage Change %
1.	5.5	28.0	+22.5
2.	0.0	18.8	+18.8
3.	0.0	16.7	+16.7
4.	15.8	30.3	+14.8
5.	.5	14.5	+14.0
6.	20.8	32.0	+11.2
7.	8.2	19.2	+11.0
8.	2.7	13.5	+10.8
9.	17.0	26.0	+ 9.0
10.	0.0	5.5	+ 5.5
11.	13.3	17.3	+ 4.0
12.	13.2	10.8	- 2.4
13.	14.0	7.0	- 7.0
14.	19.0	9.0	-10.0
15.	19.2	1.5	-17.7
Averages	9.9	16.6	+ 6.7

* The raters were looking for the following questioning behavior.

4. Elicits: Asks a question or requests information about the content subject, or procedure being considered with the intent that another should answer. (respond).

Eleven of the fifteen students increased the amount of time they spent in asking questions of students. Those teaching assistants who spent a declining amount of time on asking questions tended to be the same persons who had spent an above average amount of time asking questions in their first taping. No explanation is offered for this decline except that these participants may have felt a need to concentrate on other verbal skills than questioning. The

point to be made is that the teaching assistants as a group changed their behavior in the desired direction.

We also found that our teaching assistants were spending a great deal less time lecturing and more time responding to student questions. In Table II, one can see that the group of teachers spent an average of 41% of their time presenting information in their first tapes. The second set of tapes showed that the average amount of teacher initiated material had been reduced by 27.9%.

TABLE II

Percentage of Each Ten Minutes Teaching Assistants Devoted to "Initiating" Information Both Before and After Programmed Instruction"

Teaching Assistant	First Taping %	Second Taping %	Percentage Change %
1.	10.5	15.0	+ 4.5
2.	6.7	10.3	+ 3.6
3.	16.0	14.7	- 1.3
4.	68.5	60.5	- 8.0
5.	49.6	37.0	-12.6
6.	45.2	32.5	-12.7
7.	16.0	0.0	-16.0
8.	27.7	10.0	-17.7
9.	20.5	0.0	-20.5
10.	33.0	7.0	-26.0
11.	30.0	0.0	-30.0
12.	42.5	3.0	-39.5
13.	50.2	0.0	-50.2
14.	100.0	6.0	-94.0
15.	98.0	.5	-97.5
Averages	41.0	13.1	-27.9

*The raters were looking for the following behavior:

6. Initiates: Presents facts, information, and/or opinion concerning the content, subject, or procedures being considered that are self-initiated; expresses ones own ideas; lectures (includes rhetorical questions--not intended to be answered).

While we cannot assume a cause and effect relationship, this data does suggest that our prospective college teachers were on the average fulfilling more effectively their roles as discussion leaders in their second tapes. Future research is needed to determine the impact of our training module over a period of time.

What conclusions may be drawn from this project? First, I think we can safely say that with the appropriate inservice training materials, college teachers can learn new and effective classroom teaching skills. Secondly, it can be said that observational systems and video-taping have the potential for changing teacher behavior toward more student-centered models of instruction. Finally, this study suggests a new accountability model. A model in which the effective teacher is one who can demonstrate appropriate teaching skills in relationship to his instructional objectives.

The second research project we conducted with teaching assistants involved 18 physics laboratory instructors. The experiment was conducted during the Spring quarter of 1973 in six undergraduate, general physics courses. In the project, the TA's participated in a 10 week training program designed to improve their laboratory questioning skills. Two 30 minute video-tapes were made of each TA during the quarter, one during the first week of labs and the other during the final week of laboratory sessions. Comparisons made between the students' first and second video-tapes suggested again that video-tape is a very effective instrument for capturing teacher and/or student behavior in physics classes and/or laboratories.

The training program for the 18 TA's had as its major objective the improvement of the quality of the verbal interactions between TA's and students in the physics laboratories. It was hoped that we would be able to show at the end of the quarter a significant increase in the number of higher level questions asked by TA's. We were also hoping to show an increase in the quality of student responses to TA questioning patterns during the training program.

We hoped to modify the classroom behavior of the 18 TA's and subsequently the behavior of the students they worked with, as measured by a simplified version of the Florida Taxonomy of Cognitive Behavior (FTCB), by training the TA's in the use of a different but related pair of observational systems, the Flanders Interaction Analysis

Categories (FIAC) and a simplified Gallagher System. 8, 9, 10 Baseline measurements of the TA behavior were taken by using during the TA's first week of laboratory work. Fifteen minute video-tapes were made of each TA in the open physics labs. These tapes were then rated by a graduate student who had been trained in the use of the Florida Taxonomy of Cognitive Behavior.

The training program for the 18 TA's consisted of five classroom hours of lecture and discussion over a five week period, and 12 observer ratings of each TA by another TA over the remaining four weeks. The first seminar was devoted to a discussion of educational objectives in general and to Bloom's Taxonomy of Educational Objectives, stressing the educational objectives of the introductory physics laboratories. The aim of this session was to persuade the TA's to accept the objectives and to encourage them to begin thinking about the quality of laboratory assignments and activity. Table III depicts a simplified version of the Florida Taxonomy of Cognitive Behavior (FTCB) that was used in this study to collect data on the TA's questioning behavior.

TABLE III

Modified Version of Florida Taxonomy of Cognitive Behavior

TA's Name _____

Tape Number _____#1 _____#2

Rater's Name _____

Teacher Question Categories	Teacher Verbal Behavior (Instances of)	Total No.	% of Total Number
1. Knowledge			
2. Translation			
3. Interpretation			
4. Application			
5. Analysis			
6. Synthesis			
7. Evaluation			
TOTALS			
PERCENTAGES			

This modified version of the FTCB provided our video-tape rater with a very effective method for recording the types and frequencies of questions asked by our 18 TA's in each of their 15 minute tapes. With this instrument, the rater was able to record the number of times a TA asked a question at one of seven levels of difficulty. Every time the TA asked a student to apply his knowledge in the lab, for example, the video-tape rater would record the instance in the box opposite row #4.

For each video-tape made, then we were able to determine how many questions of each of the seven categories were asked by the TA in both his pre- and post- assessment video-tapes. All questions that required the student to go beyond pure recall of knowledge were classified as "higher level" or "higher order questions" in this project. For our project to be successful, we felt it was necessary for us to increase the number of higher order questions asked by TA's in their second video-taping.

Table IV depicts another simplified version of the Florida Taxonomy of Cognitive Behavior (FTBC) was also used in our project. This version of the observational system was employed to collect data from the video-tapes on the students' verbal responses to TA questions.

TABLE IV

Modified Version of Florida Taxonomy of Cognitive Behavior

TA's Name _____

Tape Number _____#1 _____#2

Rater's Name _____

Teacher Question Categories	Student Verbal Behavior (Instances of)	Total Number	% of Total Number
1. Knowledge			
2. Translation			
3. Interpretation			
4. Application			
5. Analysis			
6. Synthesis			
7. Evaluation			
TOTALS			
PERCENTAGES			

This modified version of the FTBC provided our video-tape rater with an effective method for recording the kinds and frequencies of student responses given to the 18 TA's questions in each of the 15 minute video-tapes. With this instrument, the rater was able to record the type of student response to each of the TA's questions. Student responses could range from pure factual recall responses to the highest level of student response, i.e., evaluation. When a student responded to a TA question on the video-tape with a "knowledge" type response then the rater would record the instance in the box opposite row #1.

For each video-tape made, we were able to determine how many student responses fell in each of the observational system's seven categories. Again, all student responses that involved more than pure recall on the part of the respondent were classified as "higher level" or "higher order" responses. The second criteria for success in our experiment was to increase the number of higher order student responses in our second set of TA video-tapes.

Before reporting the results of our project, the exploratory nature of the program should be emphasized. Because of the small sample size of TA's and the lack of a control group for comparison purposes, our findings are tenuous. Continued research and experimentation is needed.

Table V depicts the data collected from 10 of the TA's pre- and post-assessment video-tapes. (In only 10 cases were we able to get two good video-tapes for each TA. Some of the pre- and post-assessment tapes had to be rejected because of inadequate sound on the tapes). Column 1 shows the total number of questions asked by each TA, the total number of HL (higher level) questions asked by each TA, and the percentage of questions each TA asked that were "higher level" in nature. Column 2 in Table V shows the same data only for each of the 10 TA's second tapes. Finally, Column 3 shows the percentage increase or decrease in the number of higher level questions asked from the first to the second video-tape for each TA.

TABLE V

Teaching Assistant Questioning Behavior - Pre- and Post-Assessment Comparisons

Tape No.	Column 1 Questions Asked (Tape #1) Total	HL	%HL	Column 2 Questions Asked (Tape #2) Total	HL	%HL	Column 3 Percentage Increase (+) or Decrease (-) of Questions asked at HL
1.	15	9	60%	17	12	71%	+33%
2.	5	3	60%	11	8	73%	+166%
3.	12	3	25%	12	5	42%	+67%
4.	12	10	83%	5	4	80%	-60%
5.	7	1	14%	11	4	36%	300%
6.	4	1	25%	7	3	43%	200%
7.	2	2	100%	7	4	57%	100%
8.	6	3	50%	11	7	64%	133%
9.	7	2	29%	6	2	33%	-0-
10.	13	11	85%	9	8	89%	-27%
AVERAGE	8.5	4.5	56%	10.7	5.7	58.8	+27%

Seven out of 10 TA's showed gains in the number of higher level questions they asked in their pre- and post-tapes. In the two instances where there was a decline in the number of higher level questions asked, the TA's were already using a high percentage of higher level questions in their laboratory instruction. The overall percentage increase in the use of higher level questions for these 10 TA's was +27%, suggesting a positive effect for our training program. The highest number of higher level questions asked in both sets of video-tapes by any of the 10 TA's was 12 in a 15 minute period.

Table VI depicts data collected from the same 10 TA pre- and post-tapes. However, instead of describing

teacher verbal behavior, this table illustrates the type of student responses given TA questions in each of the 15 minutes taped. Column 1 in Table VI shows the total number of responses given by students to each of the 10 TA's, the total number of HL (higher level) student responses, and the percentage of student responses that were "higher level" in nature. Column 2 in Table V shows the same data as Column 1 only for each of the second tapes made during the last week of our program. Finally, Column 3 shows the percentage increase or decrease in the number of higher level responses given by students from the first to the second video-taping.

TABLE VI

Teaching Assistant Questioning Behavior - Pre- and Post-Assessment Comparisons

Tape No.	Column 1 Student Responses (Tape #1)			Column 2 Student Responses (Tape #2)			Column 3 Percentage Increase (+) or Decrease (-) in Student Responses at HL
	Total	HL	%HL	Total	HL	%HL	
1.	15	9	60%	17	11	65%	23%
2.	5	3	60%	11	8	73%	166%
3.	12	4	33%	12	8	67%	100%
4.	12	10	83%	5	3	60%	-70%
5.	7	2	29%	11	3	27%	50%
6.	4	2	50%	7	4	57%	100%
7.	2	2	100%	7	4	57%	100%
8.	6	3	50%	11	7	64%	133%
9.	6	3	50%	6	3	50%	-0-
10.	13	11	85%	9	8	89%	-27%
Average	8.2	4.9	68.2%	9.6	5.9	60.9%	21%

Seven out of 10 sets of student responses showed gains in the number of higher level responses given in the pre- and post-assessment tapes. By comparing data in Tables V and VI, it can be seen that student responses tended to follow the TA's questioning behavior. Student responses to TA questions became more complex as the TA's asked more complex (higher level) questions. In the two instances where there was a decline in the number of higher level student responses (Tapes #4 and 10), there was also a decline in the number of higher level student responses. The overall percentage increase in student higher level responses for the two sets of tapes was +21%, suggesting again a positive effect for our inservice program.

One cannot necessarily attribute the increase in higher level teacher questioning or higher level student thinking in this research to the inservice program developed and conducted. The increase in higher level questioning by TA's may have simply been the result of increased teaching experience. With increased teaching experience, new college teachers may naturally develop higher level questioning skills with or without a training program. We like to think, however, that a training program is needed. What we plan to do is conduct a follow-up study of this experiment with a control group. By comparing the results of our project, with the teaching behavior of TA's who have not received training in higher order questioning skills, we should be able to make a better evaluation of the success of our inservice program.

One cannot assume either that the results of our project support a cause and effect relationship between teacher and student behavior. The fact that higher level student responses paralleled higher level teacher questioning may have simply been a result of the students' exposure to the physics curriculum, i.e., lectures, text material, etc. The higher level of student responses later in the quarter may have been a result of good reading and project assignments.

While our study was exploratory in nature, we do feel that it suggests a number of ways to improve undergraduate instruction in physics laboratories. The majority of our 18 TA's again responded very favorably to having their teaching video-taped and studying their tapes. The

one criticism the TA's had of the inservice training program was that we did not give them enough opportunities to study their tapes. Most participants seemed eager to improve their teaching and questioning skills by viewing their instruction on video-tape. We would recommend that college departments give serious consideration to using video-tapes on a regular basis to improve faculty instruction. The use of observational systems as a way of improving one's college teaching was also accepted very well in this program.

A RECOMMENDATION

Both of the studies reported here suggest that college teachers can control and change their classroom teaching in desirable directions. In my way of thinking the effective college teacher is a person who can outline a planned teaching strategy and then model that strategy. He is also a person who can outline desirable student outcomes and demonstrate that these outcomes have been achieved in his teaching.

I would recommend that teachers be asked each year to define their objectives and the teaching strategies they plan to use each year. My accountability model would include the following elements:

1. A faculty evaluation instrument to be completed by students and faculty members that contains a list of instructional objectives that faculty could choose from for their classes.

2. This same faculty evaluation instrument would contain a fairly complete list of classroom teacher behaviors and teaching strategies that the faculty could choose from to use in their teaching.

3. At the beginning of each contract year, each faculty member would indicate to his department chairman those objectives and teaching strategies that he planned to use.

4. Under this system, students would then rate the instructors only on those items that the faculty member chose to be evaluated on.

5. Rewards in terms of promotion and tenure under this system would only be given to those faculty whose students said that they achieved their objectives and followed their pre-planned teaching strategies.

Kansas State University is already using a teaching accountability model similar to the one that I have outlined here. (Hoyt, 1970).[11] If you are interested in improving teacher accountability in your institution, I would recommend that you try an approach similar to the one outlined here. I believe it will lead to improved classroom instruction in higher education.

The second project outlined in this report was sponsored by our University's Office of Instructional Resource (OIR). This past year, OIR funded 17 mini-sabbaticals that were designed to improve college teaching at the University of Florida.[12] In closing, I would like to suggest that mini-grants, when awarded to college departments by offices of instructional resources or institutional research, can play a major role in improving college teaching. Mini-grants can be awarded to only those college departments who are willing to provide research evidence that their funds have in fact been used by teachers to increase student achievement. I would recommend that more offices of institutional research give attention to the improvement of college teaching. The mini-research grants approach is one of the best ways to achieve this goal.

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THE CONSTRUCTION AND SOME POSSIBLE USES OF AN INDUCED COURSE LOAD MATRIX

By

Norris Miner

THE CONSTRUCTION AND SOME POSSIBLE USES OF AN INDUCED COURSE LOAD MATRIX

by

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Educational Management Systems Officer

Seminole Junior College

"Who are they and what are they going to do to us," is a question asked in many sectors of the academic community about students. Presidents ask it as their offices burn. Guidance people make a living out of the question. Teachers, from their end of the bench, ask it as each new set of Garfields mount the other end. Deans, division chairmen, and janitors ask it. Even researchers have been known to lift their eyes from the sigma safety of faceless numbers to ask this question.

Once these researchers lived in quiet ivy covered towers from which at irregular but statistically significant intervals, they issued their deviations, medians, means, and correlations. As the universities and colleges entered their battle for money, students, and prestige, the tower was moved front and center. The ivy has been blasted away and the tower is now battered bastion on the front line. Neat, well done studies that demonstrate the clever statistical achievements of the researcher are still accepted. However, hard questions are asked. How much does a program Cost? How much space do we need? How many staff? What is the income by program or source? What is our real product? How can we measure our results? How? What? Who? The real question is, "Who are they, what will they do to us, and what are we doing to them."

This paper addresses itself to a partial answer to the first two parts of this question.

The Induced Course Load Matrix (I[illegible] is a method of matching students with their impact [illegible]he curricular offerings of the institution. NCHEMS c[illegible]ers students by level within Academic Major and matches this with

courses which are clustered in the same way. Dr. Matt Steele of the University of Miami[1] took students by level within major and impacted the actual courses. In any system, a classification of "Who they are" is made and the "what are they doing to us" is determined as far as effect on the course offerings is concerned.

Seminole Junior College had a little used two digit curriculum classification within the student data file. During the summer of 1972 the code was modified to better reflect the trend which was emerging from the proposed junior college PPBE system. At the same time, a proposal for a new academic advisement system, which was to match the student with a teaching faculty of advanced and professional and occupational. Experience in clustering courses within HEGIS disciplines had come from state cost accounting. With courses already clustered into HEGIS disciplines it was only a step to take these disciplines into the PPBES categories. Seminole Junior College courses grouped into 12 PPBES disciplines.

The base data was there. Should we spend the time, money and computer effort to produce the Matrix? PPBES drafts indicated the need of some Matrix. There was a strong feeling that Curriculum choices made by students on the Community/Junior College level were not meaningful, but there was no hard data. The new NCHEMS RRPM 1.6 required some form of ICLM and used a great deal of its program in the development of the Matrix. Could the RRPM 1.6 on a 16K computer be used starting with a Matrix? There was an obvious need to try the ICLM and to determine if the end product had any validity. Comparisons of the results of several semesters' ICLM's would be needed to detect any stability or change in patterns of curriculum category.

Mr. Wallace McFarland of the College Data Center developed a program which first grouped all students by their Seminole curriculum code into the Matrix curriculum categories. A sub-program replaced the course number in the student course record with the discipline category to which it belonged. The file was then sorted into ascending order keyed on the discipline number.

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1. Matt W. Steele, "Reduced Input Academic Models," Proceedings of the Fourth Statewide Conference on Institutional Research, prepared by Seminole Junior College (1971), pp 29-34.

The conversation of the Seminole course into the ICLM discipline category presented many problems. A simple grouping by course prefix would not work in all cases. The prefix BA member who was knowledgeable in the student's supposed major, was developed. The two systems were wed and implemented in Term I, 1972-73. The double need created a strong impetus to have students take time to seriously consider this item. Problems with advisement were created by the lack of distinction within the broad curriculum areas. A new code consisting of 64 curricular choices was developed to meet advisement needs. The new system went into effect in Term II, 1972-73. This new code was used as a base for the "who are they" classification.

The 64 curricular choices were grouped into 13 categories within the advanced and professional area and 3 categories within the occupational area. The curriculum choices included choices for general degree with and without transfer intentions. There were also choices for those who wished to take a course or two for retraining or occupational upgrading, and for those who wished to take a course or two for purely personal objectives. (Appendix A). Thus, the "people" dimension of the Matrix started with 20 entries. An analysis of the data demonstrated that a thorough job in reaching all students at registration had not been done. In 12% of the cases, students had either not filled in the item or the code was invalid. It was decided to group these students into an internal code and take a look at them as if they were a curricular category. The "people" classification ended with 21 items.

The proposed PPBES guides had suggested a grouping of courses which were a match of curriculum categories in the area (Business Administration) contained courses which were clustered in the Business discipline of Advanced and Professional and in both the Distributive and Technical disciplines of Occupational. Other splits came within LT (Literature), SP (Speech), HS (Humanities), and DP (Data Processing). In each of these cases, the program had to go to prefix and number to establish the clustering.

The program accumulated the total number of hours in each discipline category taken by each curriculum category. The total number of students in each curriculum category was accumulated and used to determine the average hours per student taken in each course cluster. This data was then summed to produce a total number of hours taken in each curriculum category and the average hours per student in each curriculum category. (Appendix B)

Cost data from the 1971-72 State Cost Analysis provided the input for a third item in the cells of the matrix. A direct cost of each course cluster was determined using only the teacher cost and the department overhead. This was multiplied by the total hours in each discipline category and in each curriculum category to produce a total direct cost. These were again summed to give a total for each curriculum.

The finished Matrix listed the 21 curriculum categories down the left side and the 12 discipline categories across the top. Rows become "people" and columns become "courses." Each cell contains three entries. The top number represents the total credit hours taken. The second number is the average hours per student. The last entry is the total cost of the hours taken. The total of rows list the items in the same way. The last column gives the number of students in each curriculum category. The column totals give the number of hours in each course category and in the last column, the total number of students.

The 16 K limit does not allow for storage of the total Matrix. Each curriculum category is analyzed and printed and the memory cleared before the next analysis. The curriculum category sub-program and course category sub-program are program constants whereas cost information is a program variable.

An additional Matrix has been constructed which collects courses into Seminole Junior College academic departments. This Matrix was constructed from the original and was not produced on the computer. (Appendix C)

Average hours in each course category was determined for an FTE student. The total hours in a discipline cell of a curriculum was divided by the total hours for that curriculum. The quotient was then multiplied by 15 to give the hours per FTE. This provided a better method of comparing the impact on courses in different curriculum categories. The average hours per student in course areas was not stable because the average total hours in the curriculums varied.

The exercise of producing the Matrix and the Matrix itself have been useful to the college. It is now known that the data base is sufficient in its present form to do the job. The 16 K computer has the capacity to produce the Matrix with careful programming.

An examination of the course impact of the various curriculums indicate that the choices are reasonably valid. The impact on courses appears to be what could be predicted for a student choosing to follow that major within the limitations of the general education requirements. The total average hours taken by students in various curriculum areas presents a picture of the full-time and part-time student impact that appears reasonable. The division ICLM is being studied by college mid-management as an additional tool in their decision making. The tool is new and areas of use are being developed as the Matrix is disseminated and explained.

It is planned to utilize this ICLM as the basic unit for RRPM 1.6. It will also serve as a part of the data base for PPBES. An initial effort at enrollment projection through curriculum category will be made during the summer of 1972. This projection will then be fed into the ICLM to give a discipline impact projection. The validity of the projection will be tested in the fall of the 1972-73 academic year.

Other areas in which the ICLM may be used are being considered. Could it help in a student flow model or show that this model is not needed? Can it be used to determine or predict the effects of adding new programs? How does it react to shifts in student career choice? How does it react to changes in degree requirements at the schools Seminole Junior College students choose on transfer? How is cost information adjusted in the change from the historic to the predictive mode? These ideas have surfaced in the short time the ICLM and the paradigms it indicates have been utilized.

A few caveats are in order. The ICLM is only a model and should not become an instrument to control or guide a student in his choice of courses. A science major should be allowed to take Cello IV even if it upsets the percentages. The ICLM is a means not an end. It should be used to aid in providing services to students within the framework of the established goals and not used as a reason or cause for modification of goals. It could be a means of pinpointing areas of weakness which require some action. It cannot, itself, ameliorate the condition, only illuminate it. Creative program development must still be accomplished in the same old way.

The ICLM as an aid to management decision making is only as good as the data base and the desire of the user to accept new ways of looking at old problems.

CURRICULUM CATEGORIES

State PPBS		Seminole Curriculum	
Number	Name	Number	Name
1.01	Agriculture	01	Agriculture
1.02	Biological & Physical Science	02	Bio. Sciences
		06	Earth Sciences
		07	Other Natural Science
		10	Chemistry
		11	Physics
		16	Other Physical Science
1.03	Business	36	Business Administration
		38	Accounting
		39	Other Business
1.04	Education	24	Education
		33	Recreation
		34	Coach/Teaching
		35	Other P.E.
		37	Business Education
1.05	Engineering	14	Engineering
		15	Architecture
1.06	Fine Arts	43	Speech & Drama
		50	Music
		51	Humanities
		52	Art
		55	Other Humanities
1.07	Health	03	Pre-professional
		05	Nursing

State PPBS		Seminole Curriculum	
Number	Name	Number	Name
1.08	Humanities	40	English
		44	Other Letters
		53	Foreign Languages
		54	Philosophy
1.09			
1.10	Law	21	Law
1.11	Mathematics & Computer Science	12	Mathematics
		13	Computer
1.12	Public Service	04	Home Economics
		22	Library Science
		23	Public Service
1.13	Social Science	20	Area Studies
		25	Psychology
		26	Anthropology
		27	Government
		28	Economics
		29	Geography
		30	History
		31	Sociology
		32	Other Social Science
1.14	General Degree (Transfer)	98	General Degree (To Transfer)
1.15	General Degree (Non-Transfer)	99	General Degree (No-Transfer)
1.91	Retraining	90	Retraining
1.92	Fulfillment	91	Fulfillment
1.22	Distributive	61	General-Distributive
		62	Hotel-Motel
		63	Retailing
		64	Wholesaling

State PPBS		Seminole Curriculum	
Number	Name	Number	Name
1.25	Office	66	Secretary General
		67	Executive Secretary
		68	Legal Secretary
1.27	Technical	70	D.P. (A.S.)
		71	D.P. (Certificate)
		72	Design Drafting (A.S.)
		73	Design Drafting (Certificate)
		74	Police Science (A.S.)
		75	Police Science (Certificate)
		76	Quality Control (A.S.)
		77	Quality Control(Certificate)

INDUCED COURSE LOAD MATRIX

DISICIPLINE

TERM II 1972-73

CURRICULUM	1.02 Bio & Phy Sc	1.03 Bus	1.04 Ed	1.05 Eng	1.06 Fine Arts	1.08 Hum	1.11 Math & Comp	1.12 Pub Serv	1.13 Soc Sc	1.22 Occ/ Dist	1.25 Occ/ Off	1.27 Occ/ Tech	Totals	NMB STD
	16.33	17.51	25.53	35.20	18.09	16.91	16.70	37.04	12.31	22.15	36.50	19.28		
1.01 Agriculture														
Total C.H.	94	6	23	0	25	36	34	0	48	3	0	6	275	22
Av/Stud	4.3	0.3	1.0	0.0	1.1	1.6	1.5	0.0	2.2	0.1	0.0	0.3	12.4	
Total Cost	1,535	105	587		452	609	568		591	66		116	4,629	
1.02 Bio & Phy Sc														
Total C.H.	396	6	89	0	135	171	240	0	204	9	2	28	1,280	105
Av/Stud	3.8	0.1	0.8	0.0	1.3	1.6	2.3	0.0	1.9	0.1	0.0	0.3	12.2	
Total Cost	6,467	105	2,272		2,442	2,892	4,008		2,511	199	73	540	21,509	
1.03 Business														
Total C.H.	441	336	156	0	250	473	348	1	675	165	35	498	3,378	335
Av/Stud	1.3	1.0	0.5	0.0	0.7	1.4	1.0	0.0	2.0	0.5	0.1	1.5	10.0	
Total Cost	7,202	5,883	3,983		4,523	7,998	5,812	37	8,309	3,655	1,278	9,601	58,280	
1.04 Education														
Total C.H.	334	54	179	0	202	416	114	0	657	12	21	24	2,013	174
Av/Stud	1.9	0.3	1.0	0.0	1.2	2.4	0.7	0.0	3.8	0.1	0.1	0.1	11.6	
Total Cost	5,454	946	4,570		3,654	7,035	1,904		8,088	266	767	463	33,144	
1.05 Eng.														
Total C.H.	147	6	42	30	79	151	275	0	135	9	0	17	891	82
Av/Stud	1.8	0.1	0.5	0.4	1.0	1.8	3.4	0.0	1.6	0.1	0.0	0.2	10.9	
Total Cost	2,401	105	1,072	1,056	1,429	2,553	4,593		1,662	199		328	15,397	

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Appendix B (2)

CURRICULUM	1.02 Bio & Phy Sc	1.03 Bus	1.04 Ed	1.05 Eng	1.06 Fine Arts	1.08 Hum	1.11 Math & Comp	1.12 Pub Serv	1.13 Soc Sc	1.22 Occ/ Dist	1.25 Occ/ Off	1.27 Occ/ Tech	Totals	NMB STD
1.06 Fine Arts														
Total C.H.	162	9	70	0	789	270	84	2	[illegible]	0	3	9	1,683	143
Av/Stud	1.1	0.1	0.5	0.0	5.5	1.9	0.6	0.0	2.0	0.0	0.0	0.1	11.8	
Total Cost	2,645	158	1,787		14,273	4,566	1,403	74	3,508		110	174	28,697	
1.07 Health														
Total C.H.	505	6	89	0	115	221	251	2	294	0	0	21	1,504	
Av/Stud	4.4	0.1	0.8	0.0	1.0	1.9	2.2	0.0	2.6	0.0	0.0	0.2	13.2	115
Total Cost	8,247	105	2,272		2,080	3,737	4,192	74	3,619			405	24,731	
1.08 Humanities														
Total C.H.	49	6	40	0	69	145	27	3	120	6	0	6	471	42
Av/Stud	1.2	0.1	1.0	0.0	1.6	3.5	0.6	0.1	2.9	0.1	0.0	0.1	11.2	
Total Cost	800	105	1,021		1,248	2,452	451	111	1,477	133		116	7,914	
1.09 Inter-Disciplinary Studies														
Total C.H.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Av/Stud	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Cost														
1.10 Law														
Total C.H.	134	18	57	0	104	151	87	1	234	3	0	129	918	73
Av/Stud	1.8	0.2	0.8	0.0	1.4	2.1	1.2	0.0	3.2	0.0	0.0	1.8	12.5	
Total Cost	2,188	315	1,455		1,881	2,553	1,453	37	2,881	66		2,487	15,317	
1.11 Math & Comp Sc.														
Total C.H.	59	12	18	0	22	72	116	0	75	0	0	24	398	32
Av/Stud	1.8	0.4	0.6	0.0	0.7	2.3	3.6	0.0	2.3	0.0	0.0	0.8	12.5	
Total Cost	963	210	460		398	1,218	1,937		923			463	6,571	

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Appendix B (3)

CURRICULUM	1.02 Bio & Phy Sc	1.03 Bus	1.04 Ed	1.05 Eng	1.06 Fine Arts	1.08 Hum	1.11 Math & Comp	1.12 Pub Serv	1.13 Soc Sc	1.22 Occ/ Dist	1.25 Occ/ Off	1.27 Occ/ Tech	Totals	NMB STD
1.12 Public Service														
Total C.H.	30	21	21	0	33	42	21	1	96	9	0	39	313	26
Av/Stud	1.2	0.8	0.8	0.0	1.3	1.6	0.8	0.0	3.7	0.3	0.0	1.5	12.0	
Total Cost	490	368	536		597	710	351	37	1,182	199		752	5,221	
1.13 Social Science														
Total C.H.	330	15	159	0	227	401	186	1	789	3	2	24	2,137	184
Av/Stud	1.8	0.1	0.9	0.0	1.2	2.2	1.0	0.0	4.3	0.0	0.0	0.1	11.6	
Total Cost	5,389	263	4,059		4,106	6,781	3,106	37	9,713	66	73	463	34,056	
1.14 Gen. Degree Trans.														
Total C.H.	388	51	168	0	230	420	231	2	639	15	5	60	2,209	214
Av/Stud	1.8	0.2	0.8	0.0	1.1	2.0	1.1	0.0	3.0	0.1	0.0	0.3	10.4	
Total Cost	6,336	893	4,289		4,161	7,102	3,858	74	7,866	332	183	1,157	36,250	
1.15 Gen. Degree No-Trans														
Total C.H.	58	9	33	0	32	45	28	0	84	3	6	17	315	33
Av/Stud	1.8	0.3	1.0	0.0	1.0	1.4	0.8	0.0	2.5	0.1	0.2	0.5	9.6	
Total Cost	947	158	842		579	761	468		1,034	66	219	328	5,401	
1.22 Distributive/ Vo-Tech														
Total C.H.	12	72	19	0	4	72	9	0	99	135	0	72	494	49
Av/Stud	0.2	1.5	0.4	0.0	0.1	1.5	0.2	0.0	2.0	2.8	0.0	1.5	10.2	
Total Cost	196	1,261	485		72	1,218	150		1,219	2,990		1,388	8,979	
1.25 Business/ Vo-Tech														
Total C.H.	3	96	30	0	14	69	73	0	78	21	206	121	711	68
Av/STud	0.0	1.4	0.4	0.0	0.2	1.0	1.1	0.0	1.1	0.3	3.0	1.8	10.3	
Total Cost	49	1,681	766		253	1,167	1,219		960	465	7,519	2,333	16,412	

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Appendix B (4)

CURRICULUM	1.02 Bio & Phy Sc	1.03 Bus	1.04 Ed	1.05 Eng	1.06 Fine Arts	1.08 Hum	1.11 Math & Comp	1.12 Pub Serv	1.13 Soc Sc	1.22 Occ/ Dist	1.25 Occ/ Off	1.27 Occ/ Tech	Totals	NMB STD
1.27 Technical/ Vo-Tech														
Total C.H.	101	9	112	6	58	203	111	0	357	9	0	1,049	2,015	190
Av/Stud	0.5	0.0	0.6	0.0	0.3	1.1	0.6	0.0	1.9	0.0	0.0	5.5	10.5	
Total Cost	1,649	158	2,859	211	1,049	3,433	1,854		4,395	199		20,225	36,031	
1.91 Retraining														
Total C.H.	18	12	3	0	19	6	13	0	27	6	4	23	131	33
Av/Stud	0.5	0.4	0.1	0.0	0.6	0.2	0.4	0.0	0.8	0.2	0.1	0.7	4.0	
Total Cost	294	210	77		344	101	217		332	133	146	443	2,297	
1.92 Personal Objectives														
Total C.H.	26	15	8	0	40	38	33	1	57	6	8	43	275	62
Av/Stud	0.4	0.2	0.1	0.0	0.6	0.6	0.5	0.0	0.9	0.1	0.1	0.7	4.2	
Total Cost	425	263	204		724	643	551	37	702	133	2[illegible]	829	4,801	
9.99 Invalid or No Code														
Total C.H.	433	87	195	6	264	479	180	3	540	63	25	186	2,461	262
Av/Stud	1.7	0.3	0.7	0.0	1.0	1.8	0.7	0.0	2.1	0.2	0.1	0.7	9.3	
Total Cost	7,071	1,523	4,978	211	4,776	8,100	3,006	111	6,647	1,395	913	3,586	42,318	
Total hours	3,720	846	1,511	42	2,711	3,881	2,461	17	5,493	477	317	2,396	23,872	2,244

Appendix C (1)

INDUCED COURSE LOAD MATRIX

TERM II 1972-73

DEPARTMENT

CURRICULUM	1520 HUMANITIES	1530 MATH SCIENCE	1540 SOCIAL SCIENCE	1550 PHYSICAL EDUCATION	1601 VOCATIONAL TECHNICAL	1602 BUSINESS	TOTALS	NO. STUD.
1.01 Agriculture								
Total C.H.	61	128	48	23	6	9	275	22
Av/FTE	3.3	7.0	2.6	1.3	0.3	0.5	15.0	1%
Av/Stud	2.8	5.8	2.2	1.0	0.3	0.4	12.4	R.0.9
Total Cost	1,061	2,103	591	587	116	171	4,629	
1.02 Biological & Phy Science								
Total C.H.	306	636	204	89	17	28	1,280	105
Av/FTE	3.6	7.5	2.4	1.0	0.2	0.3	15.0	5%
Av/STud	2.9	6.1	1.9	0.8	0.2	0.3	12.2	R.0.5
Total Cost	5,334	10,475	2,511	2,272	540	377	21,509	
1.03 Business								
Total C.H.	724	789	675	156	498	536	3,378	335
Av/FTE	3.2	3.5	3.0	0.7	2.2	2.4	15	15%
Av/Stud	2.2	2.4	2.0	0.5	1.5	1.6	10.1	R.0.1
Total Cost	12,558	13,014	8,309	3,983	9,601	10,816	58,281	
1.04 Education								
Total C.H.	618	448	657	179	24	87	2,013	174
Av/FTE	4.6	3.3	4.9	1.3	0.2	0.6	15.0	8%
Av/Stud	3.6	2.6	3.8	1.0	0.1	0.5	11.6	R.0.3
Total Cost	10,689	7,358	8,088	4,570	463	1,979	33,147	
1.05 Engineering								
Total C.H.	230	452	135	42	17	15	891	82
Av/FTE	3.9	7.6	2.3	0.7	0.3	0.3	15.0	4%
Av/Stud	2.8	5.5	1.6	0.5	0.2	0.2	10.9	R.0.6
Total Cost	3,982	8,050	1,662	1,072	328	304	15,398	
1.06 Fine Arts								
Total C.H.	1,061	246	285	70	9	12	1,683	143
Av/FTE	9.6	2.2	2.5	0.6	0.1	0.1	15	6%
Av/Stud	7.4	1.7	2.0	0.5	0.1	0.1	11.8	R.0.4
Total Cost	18,913	4,048	3,508	1,787	174	268	28,698	

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Appendix C (2)

CURRICULUM	1520 HUMANITIES	1530 MATH SCIENCE	1540 SOCIAL SCIENCE	1550 PHYSICAL EDUCATION	1601 VOCATIONAL TECHNICAL	1602 BUSINESS	TOTALS	NO. STUD.
1.07 Health								
Total C.H.	338	756	294	89	21	6	1,504	115
Av/FTE	3.4	7.5	2.9	0.9	0.2	0.1	15.0	5%
Av/Stud	2.94	6.57	2.6	0.8	0.2	0.1	13.2	R.0.5
Total Cost	5,891	12,439	3,619	2,272	405	105	24,731	
1.08 Humanities								
Total C.H.	217	76	120	40	6	12	471	42
Av/FTE	6.9	2.4	3.8	1.3	0.2	0.4	15.0	2%
Av/Stud	5.17	1.81	2.86	1.0	0.2	0.3	11.3	R.0.8
Total Cost	3,811	1,251	1,477	1,021	116	238	7,914	
1.09 Inter-Disciplinary Studies								
Total C.H.	0	0	0	0	0	0	0	0
Av/FTE	0	0	0	0	0	0	0	0
Av/Stud	0	0	0	0	0	0	0	0
Total Cost	0	0	0	0	0	0	0	0
1.10 Law								
Total C.H.	256	221	234	57	129	21	918	73
Av/FTE	4.2	3.6	3.8	0.9	2.1	0.3	15.0	3%
Av/Stud	3.5	3.0	3.2	0.8	1.8	0.3	12.6	R.0.7
Total Cost	4,471	3,641	2,881	1,455	2,487	381	15,316	
1.11 Math & Computer Science								
Total C.H.	94	175	75	18	24	12	398	32
Av/FTE	3.5	6.6	2.8	0.7	0.9	0.5	15.0	1%
Av/Stud	2.9	5.5	2.3	0.6	0.8	0.4	12.5	R.0.9
Total Cost	1,616	2,900	923	460	463	210	6,572	
1.12 Public Service								
Total C.H	76	51	96	21	39	30	313	26
Av/FTE	3.6	2.4	4.6	1.0	1.9	1.4	15.0	1%
Av/Stud	2.9	2.0	3.7	0.8	1.5	1.2	12.0	R.0.9
Total Cost	1,344	841	1,182	536	752	567	5,222	

CURRICULUM	ICIM 1520 HUMANITIES	1530 MATH SCIENCE	1540 SOCIAL SCIENCE	1550 PHYSICAL EDUCATION	1601 VOCATIONAL TECHNICAL	1602 BUSINESS	TOTAL	NO. STUD.
1.13 Social Science								
Total C.H.	629	516	789	159	24	20	2,137	184
Av/FTE	4.4	3.6	5.5	1.1	0.2	0.1	15	8%
Av/Stud	3.4	2.8	4.3	0.9	0.1	0.1	11.6	R.0.3
Total Cost	10,924	8,495	9,713	4,059	463	402	34,056	
1.14 Gen. Degree Trans.								
Total C.H.	652	619	639	168	60	71	2,209	214
Av/FTE	4.4	4.2	4.3	1.1	0.4	0.5	15.0	10%
Av/Stud	3.0	2.9	3.0	0.8	0.3	0.3	10.3	R.0.2
Total Cost	11,337	10,194	7,866	4,289	1,157	1,408	36,251	
1.15 Gen. Degree No-Trans.								
Total C.H.	77	86	84	33	17	18	315	33
Av/FTE	3.7	4.1	4.0	1.6	0.8	0.9	15.0	1%
Av/Stud	2.3	2.6	2.5	1.0	0.5	0.5	9.5	R.0.9
Total Cost	1,340	1,415	1,034	842	328	443	5,402	
1.22 Distributive/ Vo-Tech								
Total C.H.	76	21	99	19	72	207	494	49
Av/FTE	2.3	0.6	3.0	0.6	2.2	6.3	15.0	2%
Av/Stud	1.6	0.4	2.0	0.4	1.5	4.2	10.1	R.0.8
Total Cost	1,290	346	1,219	485	1,388	4,251	8,979	
1.25 Business/ Vo-Tech								
Total C.H.	83	76	78	30	121	323	711	68
Av/FTE	1.8	1.6	1.6	0.6	2.6	6.8	15.0	3%
Av/Stud	1.2	1.1	1.1	0.4	1.8	4.8	10.5	R.0.7
Total Cost	1,420	1,268	960	766	2,333	9,665	16,412	
1.27 Technical/ Vo-Tech								
Total C.H.	261	218	357	112	1,049	18	2,015	190
Av/FTE	1.9	1.6	2.7	0.8	7.8	0.1	15.0	8%
Av/Stud	1.4	1.1	1.9	0.6	5.5	0.1	10.6	R.0.3
Total Cost	4,482	3,714	4,395	2,859	20,225	357	36,032	

ICLM

Appendix C (4)

CURRICULUM	1520 HUMANITIES	1530 MATH SCIENCE	1540 SOCIAL SCIENCE	1550 PHYSICAL EDUCATION	1601 VOCATIONAL TECHNICAL	1602 BUSINESS	TOTAL	NO. STUD.
1.91 Retraining								
Total C.H.	25	31	27	3	23	22	131	33
Av/FTE	2.9	3.5	3.1	0.3	2.6	2.5	15.0	1%
Av/Stud	0.8	0.9	0.8	0.1	0.7	0.7	4.0	R.0.9
Total Cost	445	511	332	77	443	489	2,297	
1.92 Personal Objectives								
Total C.H.	79	59	57	8	43	29	275	62
Av/FTE	4.3	3.2	3.1	0.4	2.3	1.6	15.0	3%
Av/Stud	1.3	1.0	0.9	0.1	0.7	0.5	4.4	R.0.7
Total Cost	1,404	976	702	204	829	688	4,803	
9.99 Invalid or No Code								
Total C.H.	746	619	540	195	186	175	2,461	262
Av/FTE	4.3	3.8	3.3	1.2	1.1	1.1	15.0	12%
Av/Stud	2.8	2.4	2.1	0.7	0.7	0.7	9.4	
Total Cost	12,287	10,283	6,647	4,978	3,586	3,831	42,317	
TOTALS								
Credit Hours	6,609	6,223	5,493	1,511	2,396	1,640	23,872	2,244
Av/FTE	4.2	3.9	3.5	0.9	1.5	1.0	15.0	Stud
Av/Stud	2.9	2.8	2.4	0.7	1.1	0.7	10.6	1,591.5
Total Cost	115,299	103,327	67,619	38,574	46,197	36,950	407,966	FTE

SELECTION OF ACADEMIC MAJORS:
A COMPARATIVE STUDY OF NATIVE AND TRANSFER STUDENTS

by

E. Timothy Lightfield

and

David D. Rice

Florida State University

SELECTION OF ACADEMIC MAJORS

. . . A Comparative Study of Native and Transfer Students

Increasingly students are beginning their college work at the community junior college before transferring to the four-year or upper level university for completion of the baccalaureate degree. Most of the attention and much of the research that has been done concerning the junior college transfer have dealt with academic success factors in comparison with students who originated as freshmen at the four-year institution. Little research has been done involving questions related to the selection of academic major by the junior college transfer versus the native university student. Do junior college transfers select academic majors from the various university colleges and schools of a state university within a different pattern than do native students? What are the variables within the curriculum itself that may determine or influence the student in his selection of an academic major? To what degree does the number of academic terms that are necessitated for completion of a particular academic major program facilitate or prohibit the selection of that major by students in the two groups? That is, do junior college transfers as opposed to native students, tend to select academic majors at the university which are of a certain minimum duration?

The purpose of the study, therefore, was to identify and contrast the patterns of academic major selection for junior college transfer students and for native students at the university, in relation to the length of the required course sequence for different major programs.

PROCEDURES

The minimum number of academic quarters necessary to complete the required course sequence for all undergraduate major programs at the Florida State University was determined through analysis of the university catalog: This minimum number was determined by assuming the normal fifteen quarter hour student load per quarter; it is a function of the total number of quarter hours required for the major, the number of required courses in the major, and the sequencing of prerequisite courses in the major. (See Figure 1 for representative patterns

of such a course sequence for the major of Meterology, which requires a six quarter minimum to complete the program, and for the major of Philosophy, which requires a three quarter minimum to complete the program.)

The minimum number of academic quarters necessary to complete the required course sequence for representative undergraduate major programs at four universities in different state systems operating on a quarter calendar also were identified. Thirty major programs were cross-checked in this manner. Although specific major requirements varied, the lengths of particular course sequences were not significantly different among the five institutions. This procedure places some assurance upon the reliability of the sequence patterns found for major programs at Florida State University -- they are typical of university major programs available to community/junior college graduates.

The sequence pattern of quarters, such as noted for Philosophy (Figure 1), assumes that the individual has completed basic studies requirements as part of his associate degree or lower division program. Essential liberal arts courses that are part of the basic studies requirements, as well as the major program requirements, are assumed to be completed prior to the quarter sequence noted. Thus, in Meterology (Figure 1-4) two three-hour courses in Calculus are assumed prior to the beginning of the major sequence in the seventh quarter. Such prerequisite courses can be assumed only when applicable to liberal studies requirements. Therefore, in the applied music major, which requires twelve quarters, introductory applied music courses are not assumed.

The distribution of academic majors designated by junior and senior students at Florida State University was obtained from registration data for the fall quarter of 1972. The upper division student population with declared majors[1] (N=7747) was sorted into native (those starting as freshmen at the University) and transfer categories: The transfer students were further separated into junior college transfer and transfer from other institutions. In our initial tabulations, in-state and out-of-state transfers were also separated; because of the small number of out-of-state transfers (6% of the total) and the similarity of the distributions, these categories were combined into three groups for contrasts of the data in the study. (1) Native Students (N=3695); (2) Junior College Transfer Students (N=3418); (3) Other College Transfer Students (N=634). The academic major programs then were grouped according to university college and by the length of course sequence (as determined above).

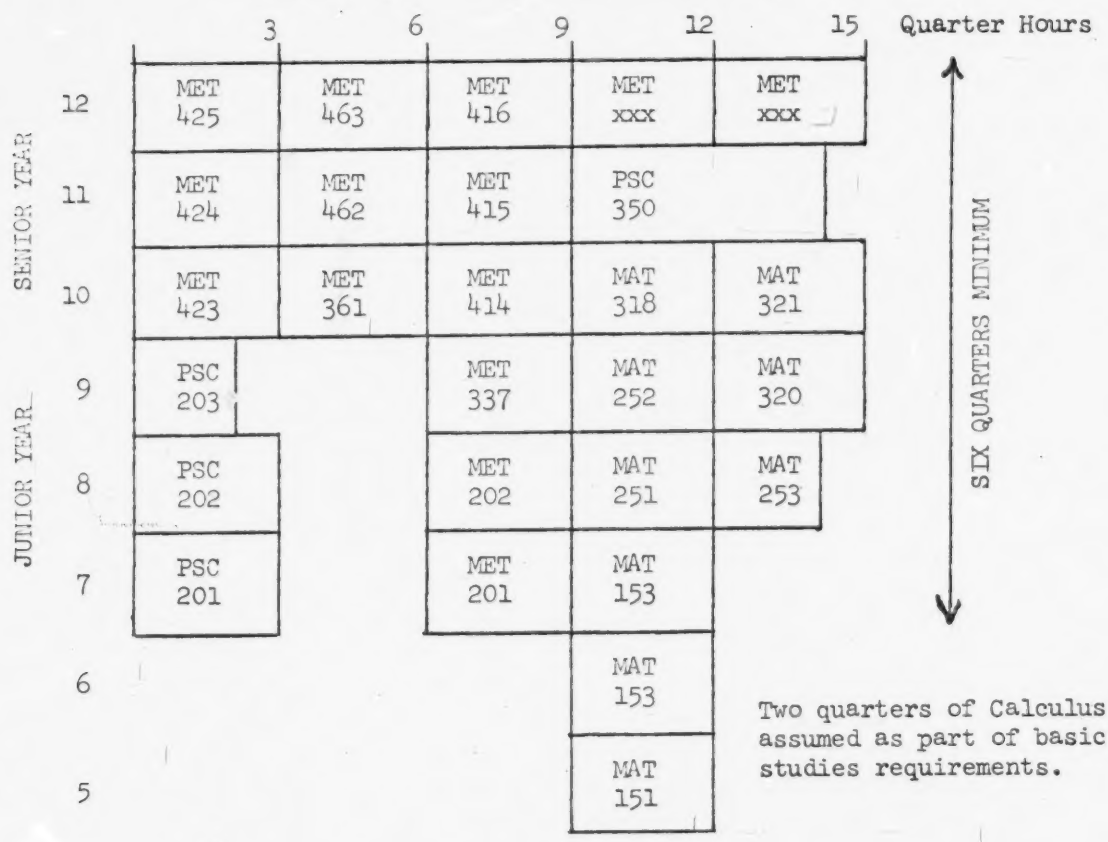
1. An additional 518 students, according to registration data, had not declared an academic major or were in special non-degree programs within the University.

Figure 1

A Model for Determining Length of Sequence for Academic Majors

Example (A).

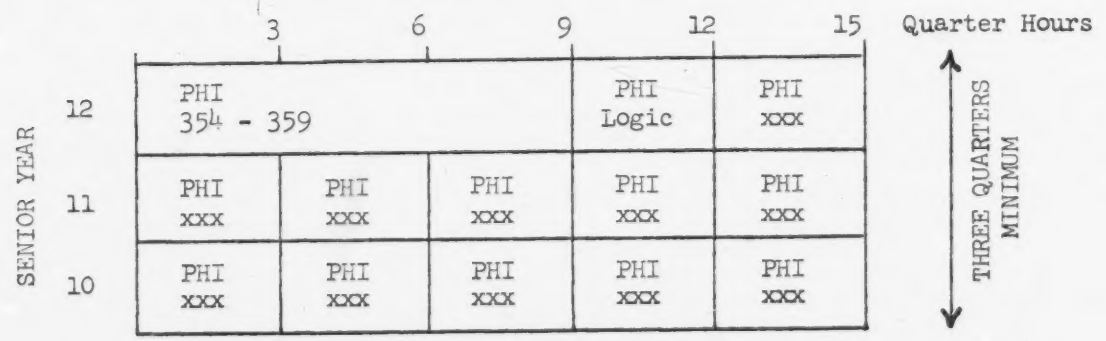
Meterology (Florida State University)



Two quarters of Calculus assumed as part of basic studies requirements.

Example (B).

Philosophy (Florida State University



FINDINGS

The range of major programs was found to vary from a sequence of three quarters for completion to a twelve quarter sequence (or the full four years) for completion. In a three quarter sequence, such as Philosophy (Figure 1-B) the student would not have to take any philosophy courses until the beginning of the tenth quarter, or by the senior year at the University. In a twelve quarter sequence, such as for Music, however, the student actually must begin to take courses in the intended major during the first quarter (or semester) of the freshman year, assuming the student intends to complete the program and graduate in four years without academic overloads.

From the distributions presented in Figure 2, we note that 29% of junior college transfer students major in Arts and Science programs, as opposed to 41% of the juniors and seniors who started college studies at Florida State University. The school of Music--characterized by long course sequences--also has substantially lower percentages of transfer students than native students selecting its major programs. On the other hand, a higher percentage of transfer than native students select major programs in the College of Education, School of Business, and School of Social Welfare. The proportion of junior college transfers who select majors in the School of Social Welfare, for example, is 14% as opposed to 6% for native students. The selection pattern of academic major within all university colleges is clearly distinctive for transfer and native students.

When the distribution of transfer and native students by the length of major sequence is analyzed, distinctive patterns again are noted. (See Table 1) For example, the comparison of programs with sequences longer than six quarters, indicates that only 13% of junior college transfers and 15% of other college transfers select these programs as compared to 18% of the native students.

Obviously, the total number of students with academic majors in a particular program length category is a function of the number of major programs included in each category. To account for this factor, we constructed a hypothetical distribution controlling for the number of degree programs in each category. Figure 3 utilizes this hypothetical distribution, which is based on equal enrollment in each program, for comparison with the actual distributions for native and transfer students.

One observation is that twenty-five out of eighty-four degree programs have sequences exceeding six quarters; according to the hypothetical distribution, this should account for approximately 30% of the upper division students, a figure considerably above the actual frequencies for native or transfer students.

CONCLUSIONS

Although the presence of other factors is conceded, college students generally are less likely to select majors with long course sequences--i.e. those requiring early specialization. This tendency to avoid certain majors is particularly true for junior college transfers when the sequence exceeds six quarters and thus requires specific course sequences during the lower division period.

Additionally, junior college transfers appear less attracted to the purely academic orientation of arts and sciences majors, preferring programs with clearer practical or vocational orientation such as in the School of Business, School of Social Welfare, College of Education, and School of Home Economics. This indicates that the vocational orientation of community/junior college students is not limited to those in the terminal two-year program.

In his study of former junior college students at Florida State University, John Nikens found that a sample of junior college transfer students distributed themselves by "ability" (as measured by Florida Twelfth Grade Test scores) into major programs in much the same way as the native Florida State University students.[2] Certainly the significance of student ability as a determining factor in the selection of academic major would not be disputed. Yet, our findings, based upon the entire population of junior and senior students at the University, indicate that length of course sequence of given academic majors also is a determining factor.

The findings of this study have potential significance for academic advisement of students. The student who plans to major in a program such as Chemistry with a

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2 Nikens, John. "The Effect of Attendance at Florida Junior Colleges on Final Performance of Baccalaureate Degree Candidates in Selected Majors at The Florida State University," College and University, 45 (Spring, 1970), 281-288.

lengthy course sequence, will need to be advised early in his program that certain critical courses must be taken by particular points in time. Thus, the student will have to make a decision about which major to select before passing what may be termed the "critical points" in his undergraduate studies at the two-year college.

By studying a breakdown of the various major programs arranged by the length of course sequence, the student can determine which majors are still open to him once he has passed certain "critical points" in his program of studies. That is, the student who has passed his junior year without having selected a definite major program, still can choose from among a number of majors, including English, Government, History, and Philosophy, and still graduate in that major within the normal academic time.

Even in the liberal arts basic studies program, certain courses have a higher level of utility or "potency" than do other courses. For example, the student who has taken two basic courses or eight quarter hours (six semester hours) of Calculus (a high potency course) during his initial years at the community/junior college, will have more options available to him for selection of a major when he transfers than will the student who selected a different math course. Thus, these courses of higher relative potency might be emphasized in the curriculum, while other courses, which do not lead to any specific options and are of essential low potency for major programs, might be de-emphasized.

Given the sequence of major programs, the community/junior college can determine those courses which are relatively unnecessary at the two-year college level. Thus, Sociology 101 might facilitate the student's opportunities to major in Sociology, Anthropology, or Psychology (as well as fulfilling a social science requirement in basic studies); additional courses in Sociology really do not enhance the academic progress of the major student at the junior college level. That is, sociology courses are not typically sequential, and as such the student can obtain all of the hours needed for that major as late as his tenth, eleventh, and twelfth quarters of college--his senior year. In terms of maintaining options for major selection upon transfer from the two-year college, the student should be advised to select high potency math or accounting courses instead of additional hours in sociology.

Ralph Schroder in his article "Independence for the Junior College Transfer Curriculum,"states that "there is really little need for more lower-division transfer majors than the four fields of physical science, life science,social science, and humanities."[3] Examination of the course sequences at Florida State University, however, indicates that some programs entered by transfer students do require specific courses not likely found in the general divisional programs advocated by Schroder. Perhaps the practice followed by many junior colleges of providing specific pre-major sequences to meet the requirements of departments at the state universities, is a satisfactory approach to this aspect of articulation.

Knowing the sequence of each major program at primary transfer universities will enable the two-year college to prune its curriculum to those high potency courses that maximize options for its students. This will allow the addition of courses based upon local needs and interests and of courses indicated by known prerequisite sequences. The college might expand its service to the local community by offering continuing education courses instead of an advanced course in European History of World Literature. Since History and English are three quarter sequence majors, the transfer student has sufficient time and opportunity at the senior institution to accumulate courses and credits needed.

3. Schroder, Ralph "Independence for the Junior College Transfer Curriculum," Journal of Higher Education, 40 (April, 1969), 286-296.

This information may have significance for various disciplines in both two-year and four-year institutions. Departments in competition for students and credit hour production should be aware of this data on major selection; those majors with the shorter quarter sequences have decided advantage. Perhaps the disciplines with the longer quarter sequences should reconsider the necessity and rationale for lengthy prerequisite chains and specific required courses. Similarly, those disciplines offering high potency courses would seem to have a decided advantage in student credit hour production.

In addition, this study of course sequence length as a determinant of academic major selection should have utility for the academic advisor in fulfilling responsibilities to students. In addition, an understanding of the patterns and relationships discovered through this research should assist advisors and student development personnel in fulfilling their broader institutional roles. The implications of course sequence length should be considered in the evaluation and planning of curriculum, the development of new programs, and the formulation of articulation policies.

FIGURE 2: DISTRIBUTION OF NATIVE, JUNIOR COLLEGE TRANSFER, AND OTHER TRANSFER STUDENTS BY UNIVERSITY COLLEGE OR SCHOOL.

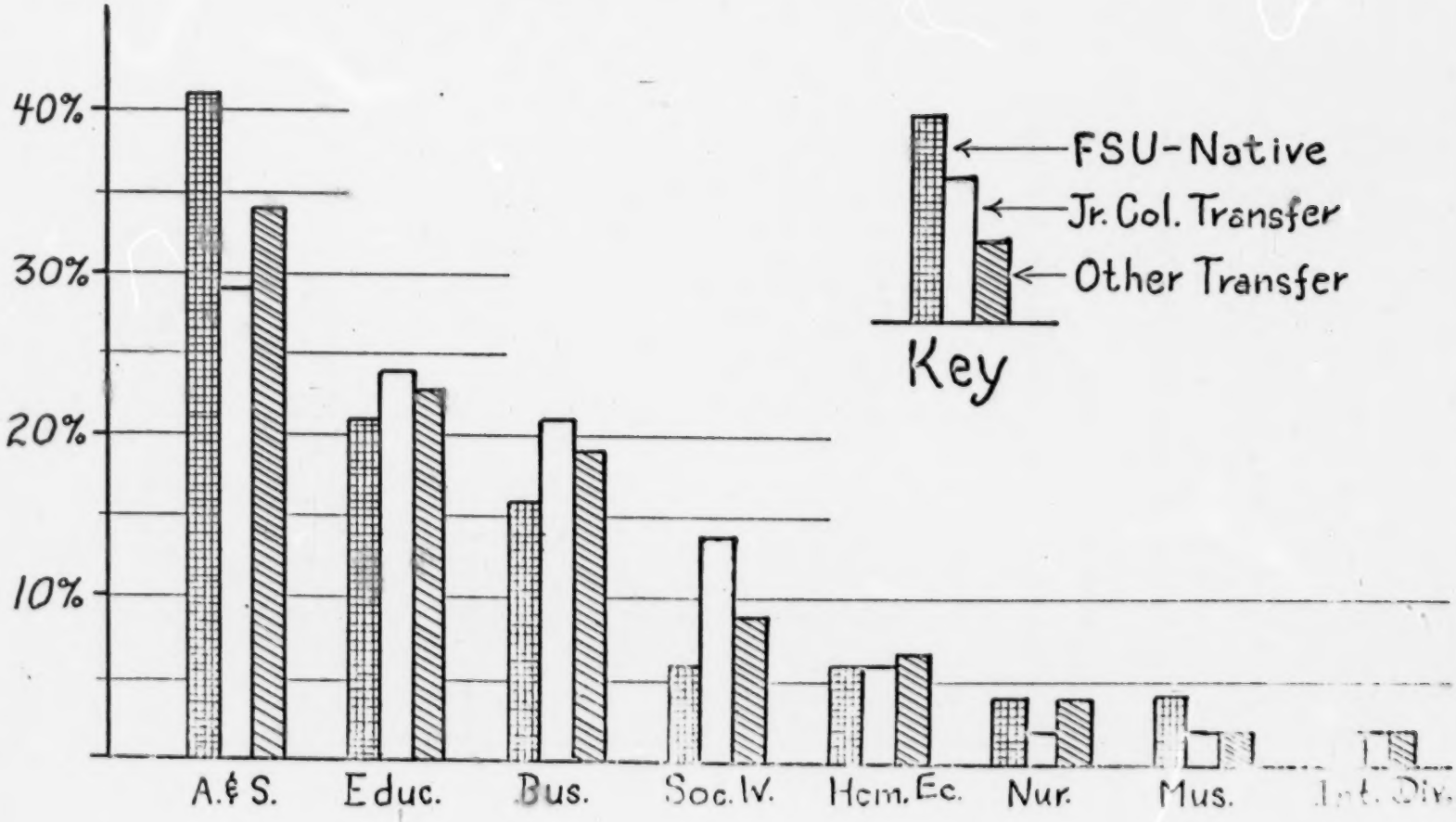

FIGURE 3: Distribution of Native, Junior College Transfer, and Other Transfer Students by Length of Course Sequence for Major Program.

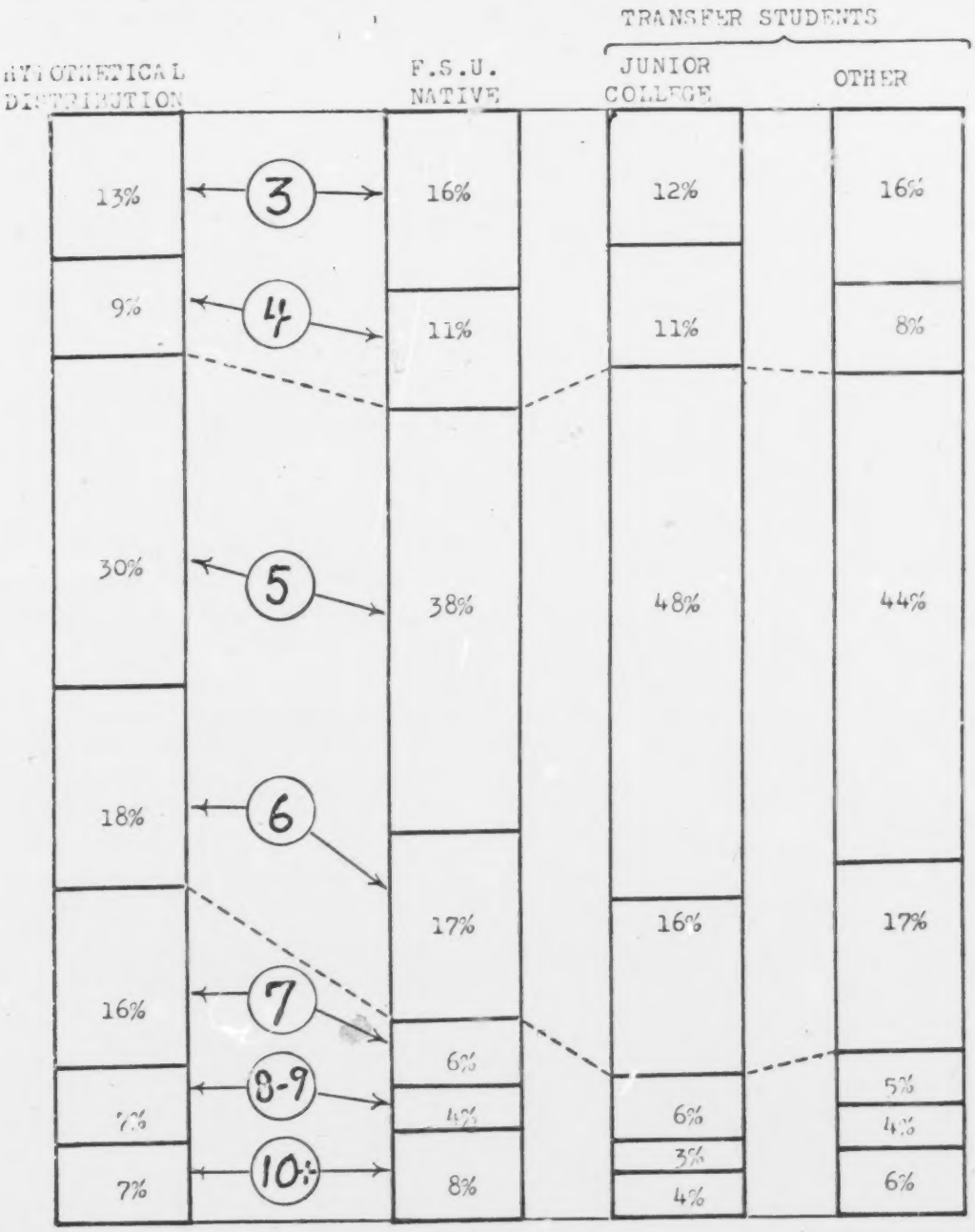

TABLE 1. DISTRIBUTION OF ACADEMIC MAJORS
BY LENGTH OF COURSE SEQUENCE

COMPLETION IN THREE QUARTERS:	Florida State	Junior Colleges	Non-Junior Colleges
Anthropology	36	41	7
American Studies	12	7	2
Communications	75	43	7
English	111	53	18
Geography	18	6	2
Government	118	94	16
History	64	48	14
Philosophy	15	14	5
Religion	35	4	2
Sociology	65	66	22
Theatre	27	46	6
	576 (16%)	422 (12%)	101 (16%)

COMPLETION IN FOUR QUARTERS:	Florida State	Junior Colleges	Non-Junior Colleges
Criminology	44	140	10
Economics	17	12	5
Humanities	28	13	0
Inter-American Studies	2	1	0
International Affairs	34	17	1
Mathematics	82	40	5
Psychology	196	136	27
Social Science	11	13	3
	414 (11%)	372 (11%)	51 (08%)

COMPLETION IN FIVE QUARTERS:	Florida State	Junior Colleges	Non-Junior Colleges
Art Education/Constructive Design	32	37	9
Biological Sciences	283	140	37
Corrections	66	135	17
Elementary Education	241	242	45
English Education	55	39	11
Finance	38	49	10
French	17	6	4
Geology	55	28	5
German	2	2	1
Habilitative Sciences	159	151	37
Law Enforcement	66	135	17

Entrepreneurship (Undergraduate)	11	27	5
Management	109	162	27
Marketing Management	58	79	7
Multi-National Business Operations	2	9	0
Office Management	11	38	3
Physical Educ. & Health/Recreation	118	218	23
Pre-Law Program (Business)	17	27	0
Risk and Insurance	12	13	7
Russian	3	0	0
Secretarial Science	2	5	0
Social Welfare	83	98	20
Vocational Education	2	2	0
	1420 (38%)	1629 (48%)	278 (44%)

COMPLETION IN SIX QUARTERS:	Florida State	Junior Colleges	Non-Junior Colleges
Accounting	209	199	27
Advertising and Public Relations	50	36	1
Asian Studies	4	3	1
Classics	3	1	1
Creative Art/History & Criticism	105	123	16
Foreign Language Education	17	3	1
Hotel & Restaurant Administration	64	78	36
Mathematics Education	55	30	6
Meterology	19	8	5
Music (Bachelor of Arts)	4	0	0
Physics	19	4	1
Social Studies Education	53	50	6
Spanish	21	12	4
Statistics	3	0	0
	626 (17%)	547 (16%)	105 (17%)

COMPLETION IN SEVEN QUARTERS:	Florida State	Junior Colleges	Non-Junior Colleges
Business Education	18	16	1
Clothing & Textiles (4 programs)	56	69	17
General Home Economics	5	2	0
Home & Family Life (4 programs)	76	41	4
Industrial Arts Education	23	37	7
Medical Technology	29	7	0
Science Education	18	20	2
	225 (06%)	192 (06%)	31 (05%)

COMPLETION IN EIGHT-NINE QUARTERS:*	Florida State	Junior Colleges	Non-Junior Colleges
Chemistry (9)	39	14	3
Food & Nutrition/Dietetics/Admin.(8)	26	17	7
Home Economics Education (8)	52	72	17
Music Therapy (9)	21	10	2
	138 (04%)	113 (03%)	29 (05%)

COMPLETION IN TEN OR MORE QUARTERS:*	Florida State	Junior Colleges	Non-Junior Colleges
Music (Composition) (12)	2	1	0
Music Education (11)	77	37	7
Music (History & Literature) (12)	6	0	0
Music (Performance) (12)	42	16	4
Music Theory (12)	6	3	1
Nursing (12)	163	86	27
	296 (08%)	143 (04%)	39 (06%)

*Note: Actual length of course sequence is in parentheses.

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Schroder, R. Independence for the junior college transfer curriculum. Journal of Higher Education, 1969, 40, 286-296.

REMARKS

By

REPRESENTATIVE TERRELL SESSUMS

SPEAKER, FLORIDA HOUSE OF REPRESENTATIVES

To

THE FLORIDA INVITATIONAL CONFERENCE

Of

INSTITUTIONAL RESEARCH

At

Tampa, Florida

Thursday, June 28, 1973

Downtown Holiday Inn

For Release: Upon Delivery (7:30 P.M.)

EDUCATIONAL FUNDING: ADEQUATE AND EQUITABLE

You have asked me to address myself this evening to a topic which is very close to my heart -- the educational funding act which was adopted by the Florida Legislature at the 1973 session just concluded.

This is my eleventh year in the Florida House of Representatives, and the Florida Education Finance Act of 1973 represents the attainment of my principal legislative objective during my decade in the Legislature.

I am delighted to discuss this legislation with you, not merely becuase I was its principal sponsor with a deep sense of personal pride of authorship but, because it now places my home state in the undisputed front rank of all the states in educational funding -- in terms of the adequacy of the funding and, of more importance in the years to come, in terms of the equity in which that funding is both raised and allocated.

Not only is it the biggest milestone in Florida's march toward public school excellence but it also is quite likely to become the benchmark, if not the model, for other states.

This is true not only for the southeastern states from which you have come tonight but also for the rest of the nation.

Florida's new act meets, better than that in any other state except Hawaii -- which is the only state which funds education with no local contribution -- the requirement for adequacy and fairness in public school financing.

This test of adequacy and fairness, as spelled out by the California Supreme Court in the Serrano case, is that the wealth of the state should stand behind each school child, so that state aid could compensate for differences in the wealth of the local school district.

Or, to state it another way, the quality of a child's education no longer may be left up to the property wealth which is the tax base which determines the level of funding of the school district in which that child lives.

To better understand where Florida now is in school funding it might help to first understand where it was and how it got here from there.

Even before the 1973 act, Florida was better off, in terms of compliance with the principle of the Serrano decision, than most states.

Here is how that came to be:

During the depression years Florida was mired down in what can be described aptly as the swamplands of public school education -- in quality of instruction, adequacy of funding and equity of taxation.

During those years it was largely every school district for itself when it came to paying the cost of public education. There were as many different levels of educational opportunity in Florida as there were individual school districts.

If a child happened to live in a county with a wealthy property tax base that child could receive a relatively good education, at least compared with children in the less wealthy counties. But a child living in a tax-poor county got a miserable education.

Then, in 1947, Florida public education attained its first significant plateau, on the long road upward out of the swamplands.

It came in the form of what is known as the Minimum Foundation Program. That program was revolutionary for its day, and it helped to establish Florida's claim to national leadership in public school education.

The concept of the Minimum Foundation Program began to be adopted, in one form or another, by other states.

That concept said, simply, that the state government -- for the first time -- would see to it that no child, regardless of where he or she lives in Florida, would receive an education which fell below a certain minimum level.

And it left it up to each county, within that county's financial means, to raise its educational level above that minimum as far as it wished.

My public school education in Florida was completed before the Minimum Foundation Program went into effect. My children, however, are its current beneficiaries. So I am well-acquainted with the differences, and I can assure you the differences are dramatic.

But we could not settle for the Minimum Foundation Program, as superior as it has been over what we had before. For the program was just what its name implies: it assured no more than a minimum level of quality.

The goal, then, became the assurance of a maximum level of quality in education.

So, in 1970, more than two decades after we began the Minimum Foundation Program, Florida's climb to educational excellence embarked upon an even higher path which we felt would take us eventually to the very pinnacle. In that year, the legislature committed the state to another brand-new policy: the concept of equalization, as the surest means of attaining maximum quality education.

This concept said, in effect, that the state should begin to try to guarantee not just a minimum but a quality educational program by a more adequate and a more equitable allocation of state funds with less reliance upon local property taxes.

To achieve that, the new policy, of which I am proud to have been a principal sponsor, called for each county to make a certain minimum level of local support in order to participate in the benefits of this accelerated joint state-local program of funding.

At that time, the total millage which the state required a county to allocate for education was three mills. In 1970, that mandatory minimum was increased to seven mills to be achieved over a four-year period and with a corresponding increase in state support of $1,100 per instructional unit for each annual increase in required local effort. By the current school year that goal had not been fully met.

The required local effort in the current year was at six mills out of the full ten mills total of which counties are allowed under the Florida Constitution to tax local property for school support.

Thus, the way was begun -- but only begun -- toward the state significantly equalizing each county's school funding regardless of the property wealth in that county.

The concept of equalization recognizes that some counties have relatively few school children and relatively wealthy property tax rolls, while other counties are rich in school children but poor in property.

It makes it possible for the state government, which has a responsibility to the entire state, to treat all school children equally.

It recognizes that a child raised in one county who has not received a good education may well grow up to be a financial burden on another county with a wealthy school district.

For, in this age of high mobility, today's educational failure in one county may well be tomorrow's welfare case or criminal or economic failure in another county.

It accepts the fact of life that the educational opportunity of any child anywhere in Florida affects the future of all of Florida. The people of Florida, in short, have made the decision that no longer can they afford anything less than the very best for all the children in Florida.

The 1973 Legislature recognized that the beginning it made in 1970 toward equalization was inadequate. The experience in those years demonstrated that if we were in fact to achieve full equalization a wholly new formula of funding would be necessary, a new formula which would get entirely away from the old, inadequate vestiges of the Minimum Foundation Program.

Of major help in highlighting this need was the work of the Governor's Citizen's Committee on Education, which called for such a new formula based on the following criteria:

1. <u>The new formula should be simple</u>.

The committee found that a thicket of "underbrush" had grown up around the Minimum Foundation Program in the form of numerous changes which had been made over two decades to try to keep that program abreast of the changing times.

2. It should meet the "Serrano" test.

Florida, as I mentioned, already was ahead of most states in this respect, and it was imperative that any new formula continue in this direction and not depart on some contrary direction.

3. It should provide for special education programs.

In some cases, the cost of educating handicapped or disadvantaged children could run many times the cost of educating the so-called average child. The old formula failed to take this properly into account.

4. It should be out-put-oriented.

This would call for a big change, in step with our Educational Accountability Act of 1971, which I had authored, because most of our programs still were process-oriented.

5. It should take into account the differences in costs other than differences in program costs.

6. It should provide for full state, rather than local, funding of capital outlay for construction of school buildings.

This, too, would mean another significant change in the way schools are funded in Florida, for the burden of building schools traditionally has been largely a local, rather than state, responsibility.

Those were the yardsticks by which our 1973 legislation was to be drafted and measured. By those standards it measured up beautifully.

The five major goals of the Florida Education Finance Act of 1973 were spelled out in the legislative intent section as follows:

1. Guarantee to each child, regardless of where that child happens to live, an educational program appropriate to his or her needs;

2. Increase the discretionary authority of local school districts and encourage their innovative programs:

3. Assumption by the state of the responsibility for capital outlay;

4. Encourage innovative designs of school facilities, construction methods and financing mechanisms, and

5. Provide a more thorough analysis of public school financing and a more rational basis for making educational decisions.

In practical terms, then, how was that legislative intent carried out in the act?

The major policy features of the new act call for:

1. Funding based on student costs.

In the past, educational funding in Florida was based on what it cost to finance an "instructional unit" -- in other words, teacher costs.

The new act turns it around. It bases funding on what it costs to educate a student -- more specifically, a full-time-equivalent student or FTE.

An FTE is defined as a membership by one or more students in a program for 25 hours a week in grades 4-12 or 20 hours a week in grades K-3.

In double-session schools students may qualify for an FTE of up to two and a half hours less per week.

2. Compensatory funding

By basing funding on student costs rather than on instructional unit costs we are able to allocate funds more realistically. It takes into account that it costs more to educate some students than others, depending on the various programs they are in.

For example, it costs more to educate a student who is physically handicapped than it does to educate the average student and more to educate students in K-3 than in grades 11-12.

To compensate for this, a base student cost figure was set. And then a cost figure, or multiplier, was assigned to each educational program in relation to its actual cost difference.

The base student cost factor was projected at $587 for the average student in Grades 4-10, the lowest-cost program. The base figure will change some, subject to fall enrollment.

Grades 11-12 were assigned a cost factor, or multiplier, of 1.10; K-3, 1.20; educable mentally retarded, 2.30; deaf students, 4; certain categories of visually handicapped, 10, and so on, up to a factor of 15 for homebound students.

The cost base of $587 is then multiplied by the appropriate factor. Grades 4-10, with a factor of 1, will earn a base cost of $587; Grades 11-12, with a factor of 1.10, will earn a base cost of $645.70; K-3 with a factor of 1.20, will earn a base cost of $704.40, and, at the top, homebound students with a factor of 15, will earn a base cost of $8,805.

Such weighting of the base student cost makes it possible to fund the special needs of each category of student. For example, the additional $117.40 which a student in K-3 receives under the new formula enables school districts to lower the pupil-teacher ratio in those classes, which has proved to be so effective at those levels in giving children a much better "launching" into the educational process.

3. Cost-of-living differential

It costs more to live in metropolitan Dade County (Miami) than it does in rural Gadsden County (Quincy), and there are variations in costs of living among the remaining counties.

The new formula takes these into account. The base student cost for Dade County is set at 1.09 of the base $587 student cost, or at $639.83. In the lowest-cost-of-living counties, such as Gadsden, the cost-of-living factor is set at .90, which brings the base student cost down to $528.30.

4. A continued high level of required local effort.

For the 1973-74 school year, a county must assess at least 6.2 mills in order to participate in the joint state-local funding program. The realities are that no county can afford not to take advantage of the available state funds, so in effect there is a mandatory 6.2 mill effort required of each county. This is an increase over the 1972-73 requirement of six mills.

In the next year, 1974-75, the required local effort is raised to seven mills.

During the 1973-74 school year, the 6.2 mill required local effort is designed to produce $324 million total from the 67 counties, as their contribution to the joint program.

There is nothing to prevent a county from leveying more than the minimum required local effort, up to the full 10 mills allowed for school funding by the Florida Constitution as almost all do.

5. Equalization funds from the state to poorer counties which make additional local efforts.

But 6.2 mills out of a possible 10 mills -- or 62 percent -- this coming year is not full equity. Nor is the 70 per cent -- that is, seven mills out of a possible 10 mills -- for the 1974-75 year full equity.

So the new formula goes a crucial step further toward full equity. It recognizes that some counties simply do not have the property wealth to finance their local contribution as do other counties.

Were the formula to be stopped at this point, without the equalization factor supplied by the state, then the children in those property-poor counties would have to suffer.

In order to move substantially closer to the goal of full equity -- yet to leave the counties room, within the remaining optional mills, to provide their own innovation -- the new formula projects additional new state funds, above the $587 base student cost, directed primarily to counties with poor property-tax bases, to bring them closer to the abilities of the wealthier counties.

Here is how the equalization factor works: A determination is made as to how much each county can raise per student for each of the optional 8th, 9th and 10th mills. To do this, a county's assessed valuation valuation on the previous calendar year's non-exempt tax roll -- exclusive of that portion of homestead exemption Florida permits for school tax purposes -- is divided by that county's unweighted FTE total to determine its property tax yield per unweighted FTE student per mill of property tax levied.

If that amount turns out to be less than seven per cent of the base student cost (or seven per cent times $587 or $41.09 in fiscal 1973-74) then the county is entitled to receive an amount from the state for the difference per unweighted FTE student multiplied by the county's unweighted FTE total for each mill or fraction of a mill that the county levied the previous year at or above eight mills.

In the 1974-75 year, the percentage to be equalized for each of the optional 8th, 9th or 10th mills actually levied by a district goes up from seven per cent to eight per cent of the base student cost.

This is both a supplement and an inducement to the counties -- they are induced to levy more than the minimum required millage through additional state funds applied to each mill or fraction of a mill levied at or above either mills.

The jargon for this is known as "power-equalizing the eighth, ninth and tenth mills."

What it means is: No child is penalized because he lives in a poor county, for the state has found a way to guarantee funds for a quality-level of education.

Thus, equalization in Florida does not mean equalizing the level of funding from the rich counties down to the level of the poor counties but from the level of the poor counties up to a maximum state-wide level.

If you are fascinated by formulas, this is how the new Florida Education Finance Act of 1973 is computed:

FTE times program cost factors times base student cost plus compensatory education factors times cost-of-living factor minus required local effort plus state equalization.

6. State Funding of categorical programs

In addition to that basic educational funding, the Legislature this year also provided for state funds to carry forward several continuing and some new programs -- such as educational leadership training programs, school lunch programs for the needy and driver education.

2

One of the new categorical programs is the Safe Schools Act, which I sponsored in this session.

With a first-year appropriation of $1,850,000, it gives to counties, in relation to their population, funds to be used to develop innovative programs for protecting the persons and property of the students and school personnel from acts of vandalism and disruption.

7. State Funds for transporation

Previously, the counties bore the brunt of transportation costs. The 1973 Legislature turned this around, reimbursing nearly all the costs and starting off with a level of 68 per cent state funding this coming year with 100 per cent scheduled for next year.

8. State Funds for capital outlay

The legislature appropriated $89.5 million for capital outlay and debt service for local school construction during the next fiscal year.

It set up an annual formula aimed at handling this over the next five years.

9. Homestead exemption compensation

The legislature also agreed that the state should reimburse to the counties almost all of the funds they will lose due to the homestead exemption allowed against property taxes for school purposes. That comes to $5,600,000.

10. Hold-harmless provision

To prevent any county from losing funds during the first year of the new funding formula there is a guarantee that each county will receive at least as much as it did in the 1972-73 school year, plus an inflation factor of an additional 5%.

What does all of this mean in terms of dollars?

It means the 1973 Legislature wrote a check for $921,509,000 -- almost one-fourth of its entire appropriations act and nearly one-half the general-revenue budget of the state -- to be invested by the state in elementary and secondary education in the coming year. That is $133 million more than the state provided for this current year.

When you add the state's contribution to the $324,028,807 of required local effort from the 67 counties, that puts Florida's joint state-local public school outlay for the next year at nearly $1.25 billion.

As important as dollars are they are not so important as how they are raised and how they are spent.

The beauty of the Florida Education Funding Act of 1973 is that it combines all the best -- adequacy in funding plus equity in raising and spending those funds.

The act is not perfect. It will stand improvement in the future sessions.

But the die has been cast. Florida never will be able to revert to the old ways of inadequately and inequitably funding public education.

I will not oppress you with further details, but an absolutely essential concomitant feature to the new education finance act is the Property Assessment Administration and Finance Law of 1973.

In brief, this law of which I also am proud to have been sponsor, gives the state government the means to make sure that the property which produces the revenue for local contributions to the public schools is assessed fairly, as required by the Florida Constitution.

It is going to mean that no county will be able to avoid its fair share of the educational funding burden. And that is the essential handmaiden of the new education finance act.

The new act also requires a business-like cost-accounting system, to keep track of how well school districts achieve certain established educational objectives and the relative cost-effectiveness of different educational programs. Thus, this part of the act is based on output rather than input, as mandated by our Educational Accountability Act of 1971.

Together, all these new features add up to both adequate and equitable educational funding.

Ten years, 12 years, maybe even five years from now some place in the State of Florida some boy or girl will reach out and receive a high school diploma -- the very first graduate of a Florida education, an education of excellence, made possible by these two acts of the 1973 Legislature.

The day that happens will be the beginning of an impact upon this state, and within this nation, which cannot be measured by dollars and cents alone.

Florida then will begin to reap in full measure the harvest of excellence which its present, newly won position of leadership in education finance is going to make possible.

At that point, the millions upon millions of dollars the people of Florida will have invested in education, the years of patient pressure and legislative battle will have paid off.

And it will be worth it all, and so much more besides. For more than any single thing the people of a state can do, it will finally provide all our children with a truly equal opportunity for a quality education and the resulting fulfillment of human potential, all too frequently wasted today.

When you reduce life in Florida, in America, to its essentials, this is really what its all about.

DEFINITIONS OF FACULTY EFFORT CATEGORIES

OR, WHAT IS "INSTRUCTION" ANYWAY?

by

Denise Strenglein

DEFINITIONS OF FACULTY EFFORT CATEGORIES:

OR, WHAT IS "INSTRUCTION" ANYWAY?

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Introduction

With the advent of more centralized control of budgeting at the state-wide level, it becomes more and more important that agreement be reached on how to fit actual faculty activity to budgeted task categories. Furthermore, faculty activity reporting will be influenced by the development, now under way, of unified Federal guidelines for cost studies. These will affect many institutions involved in federally sponsored research and training grant activities.

We, in Florida, will face the problem of reconciling the state's somewhat limited budgeted definition of faculty effort cagegories with the Federal requirement for actual, ex post facto, activity reporting. In addition, actual distributions of effort are required in the budgeting process as a baseline for subsequent years and and there is some pressure for the actual data to match the assigned, that is, the budgeted distributions.

Purpose

The purpose of this paper is to suggest the beginnings of a compatible and more complete set of definitions of faculty effort to be used within the State of Florida. It will contain a discussion of the types of activities generally considered part of faculty workload and an attempt will be made to fit these activities into the framework of current state budget categories of effort. Further, a brief description of how the above mentioned categories may be subdivided to meet federal auditing guidelines for generation of overhead rates will be presented.

Budget Categories

The state's categories of faculty effort as they appear in University operating budgets are Instruction, Creative Activity and Research, Public Service, Academic Counseling, and Administration. Appendix A lists the definitions of these categories supplied in 1970 with the Program Planning and Budgeting System (PPBS) instruction package. Appendix B gives the latest descriptions from the State Program Structure. (The program structure encompasses more than just faculty task categories.)

Instruction

Both of the above mentioned documents define instruction in terms of faculty participation with students registered for credit. Thus, the inclusion in the category of instruction of such faculty activities as classroom teaching, laboratory supervision, supervision of students in independent study and the like, meets with no disagreement. Then there are the related activities such as course preparation, student conferences, and test grading which are generally accepted as an integral part of the above mentioned teaching activities. However, the categorization of such activities as instructional committee work, tutoring the disadvantaged, major curriculum revision, development of innovative teaching methods, involvement with graduate students in research projects, and such, raises some difficult questions. Effort associated with these activities produces little or no measurable output, yet the activities produces little or no measurable output, yet the activities seem to fit the category of instruction better than any of the other budget categories. On the other hand, inclusion in instruction of activities which produce no student credit hours tends to lower productivity as measured in student credit hours per full time equivalent teaching position. (This productivity measure has become the major budgeting criteria.) Yet to totally exclude consideration of these activities as a measure of workload is to ignore a large segment of what faculty members consider to be a part of their job.

Consideration should also be given to maximizing the instruction-research cost pool in order to achieve a more favorable overhead rate. Faculty will report the time spent in these non-credit producing activities. It will be advantageous to have them reported as instruction. However, unless every university reports comparably, inequities between institutions will result.

Level of Instruction

There exists another problem related to reporting instructional activity. In 1971 the level of student credit hour (SCH) was redefined so that graduate level SCH is produced only by bona fide graduate students registered for graduate courses. On the other hand, the only convenient method of reporting faculty instructional activity is by absolute course level. Since there is considerable crossover in student level in graduate courses there is no convenient way to accurately tie FTE's of teaching by level to actual credit production by level. One solution to this dilemma is to have the SCH level definition returned to a straight course level basis. Another is to prorate faculty FTE in proportion to enrollment by student level. The point is that an agreeable solution should be found and implemented consistently at all the institutions involved.

Research and Creative Activity

Existing definitions of research and creative activities are fairly explicit. One of the difficulties arising here comes in attempting to separate research for which budgeted lines are allocated from research performed by individuals whose assignment includes no research release time. Studies indicate that faculty members who are inclined to do research will do so even when assigned a full teaching load (Keene, 1970). Thus, a person assigned full time to teaching may report research on an activity report thereby creating an imbalance between the actual and the budgeted effort distributions. The current academic reward system places emphasis on publication or related outputs of research and creative activity. A schizophrenic situation is created when faculty are denied the right to report such activity on the grounds that they were not assigned to do it.

A second consideration pertinent to research is the division of research effort between departmental budgeted research and contract or grant sponsored research. It is illegal to perform non-grant related university activities while being paid by a grant unless some equitable trade in resources is arranged. Yet it is known, but in many cases, not documented, that both formal and

informal trading of resources does occur usually at great expense to the University. (Taylor, 1972). The grant overhead rate is a function of just such trading, with the understanding that the institution is being partially reimbursed for its contributions to grant activities. Yet who is really willing to document, in a state report, that state funded lines are being used in support of grants? This has become especially awkward in view of the recent legislative efforts to deemphasize research by providing rewards for quality teaching in higher education regardless of research output (HB 1726, SB 1075, 1973). Some policy statement clarifying the extent to which the state is willing to support contract and grant sponsored activity would be most helpful.

Public Service

The state program structure specifies public service as non-credit continuing education, community service, Radio-T.V. and agricultural extension. There is an important omission, namely, service to the university. Reference to definitions of faculty effort used by a number of the universities in the State of Florida shows that this may be included in either public service or in administration. Again we are faced with legitimate faculty activity which is not recognized in the budgeting process and hence is not consistently handled among the institutions.

Another interesting note is the fact that, under Federal accounting guidelines, non-credit continuing education is considered to be a part of the instruction-research cost pool. Thus, it is to the institution's advantage to define non-credit continuing education as instruction since this pool contributes to the overhead rate while the other institutional activities pool, which includes public service activities, does not. (Principles for Determining Cost ..., 1970).

Academic Counseling

In the state program structure, academic counseling (or advisement) is one of the categories under student services. The definition specifically excludes counseling centers, placement bureaus, and health services. Thus, if the program structure were strictly interpreted, no

assignment of faculty to formal counseling and career guidance would be possible. Ideally, the designation of this budget task should be changed to a more comprehensive title. In any case, agreement should be reached as to how other kinds of counseling done by faculty are to be reported assuming no redefinition takes place.

Administration

While the activities of program directors, chairmen, deans and the like are obviously what is intended as academic administration, the university service function of non administrative faculty falls into a grey area. When faculty report, as administration, time spent on university committee activities the result is an apparent inflation of use of lines for administration. The public service category is the other conceivable place for reporting such activity, but again, the existing official definition does not seem to fit. If either administration or public service is to be more liberally interpreted to include university service, then the budget formula for assigning positions for such activities needs reassessment.

Another issue arises in grant reporting for the purpose of Federal cost accounting. There are two basic types of academic administration; departmental, which includes college administration, and university-wide. Consideration must be given to separating the two when activity data is collected.

Conclusion

Some, but certainly not all, of the difficulties encountered in tying actual faculty activity to assigned categories have been discussed. What is needed is a system-wide task force to work out consistent methods for dealing with all the problems. It is recommended that the task force be made up of representatives from the state universities and the Board of Regents. Such a task force could carry out a complete study of the problems faced by each institution, discover those that are mutual, and recommend solutions upon which future policy can be based.

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APPENDIX A

PPBS INSTRUCTIONS - FACULTY EFFORT

EXCERPT

PPBS INSTRUCTION PACKAGE - FACULTY EFFORT

The full-time effort (FTE) of a faculty member is the aggregation of all those activities which the chairman determines as satisfying the faculty member's contractual obligation to the department. These activities are defined as:

Instruction: Those (requested $) funded activities involving faculty participation with students registered for credit hour recognition of their involvement.

Creative Activities and Research: Those (requested $) funded activities, excluding instruction, involving faculty participation in the acquisition of production of new knowledge or new applications of existing knowledge.

Public Service: Those (requested $) funded activities, excluding Instruction and Creative Activities and Research, which involve faculty participation and which relate the expertise of these faculty to the requests and needs of one or more publics.

Academic Counseling: Those (requested $) funded activities excluding instruction, Creative Activities and Research, and Public Service, which involve faculty participation in advising students on the composition of their academic programs.

Administration: Those (requested $) funded activities, excluding the above activities, which involve faculty participation in various levels of university management.

The full-time effort for the academic year is distributed by the chairman on a percentage (rounded to nearest 5% for each activity) basis over the activities listed on the FTE form after negotiation with each faculty member. The assigned effort of all permanent faculty (both full-time and part-time appointments) and all others who teach at least one class or lab should be included. Each person should be reported on a "rank" basis.

Examples of effort distribution are:

Rank	% FTE to Dept.	LL	UL	Grad	Adv. Grad	Research	Admin.	Total Effort
Prof.	.50	.20	--	.20	--	.10	--	.50
Assoc. Prof.	1.00	.30	--	.30	.20	.20	--	1.00

For purposes of distributing effort over levels of instruction the following division should be followed:

LL = All undergraduate courses number 299 or below

UL = All undergraduate courses number 300 to 499

GRAD = All graduate credit hour work except -

ADV.GRAD = Dissertation credit hour work.

Completed copies of these forms will be forwarded to the State University System Office. These forms request detail beyond that provided on the Program Memoranda. Their major purpose is to provide visibility for significant (requiring $3,000 or more support, for example) projects planned for the first year of the six-year plan. These forms are not intended as accounting documents. However, the total support needed for the various projects listed should reflect a major part of the total department support requested in these areas.

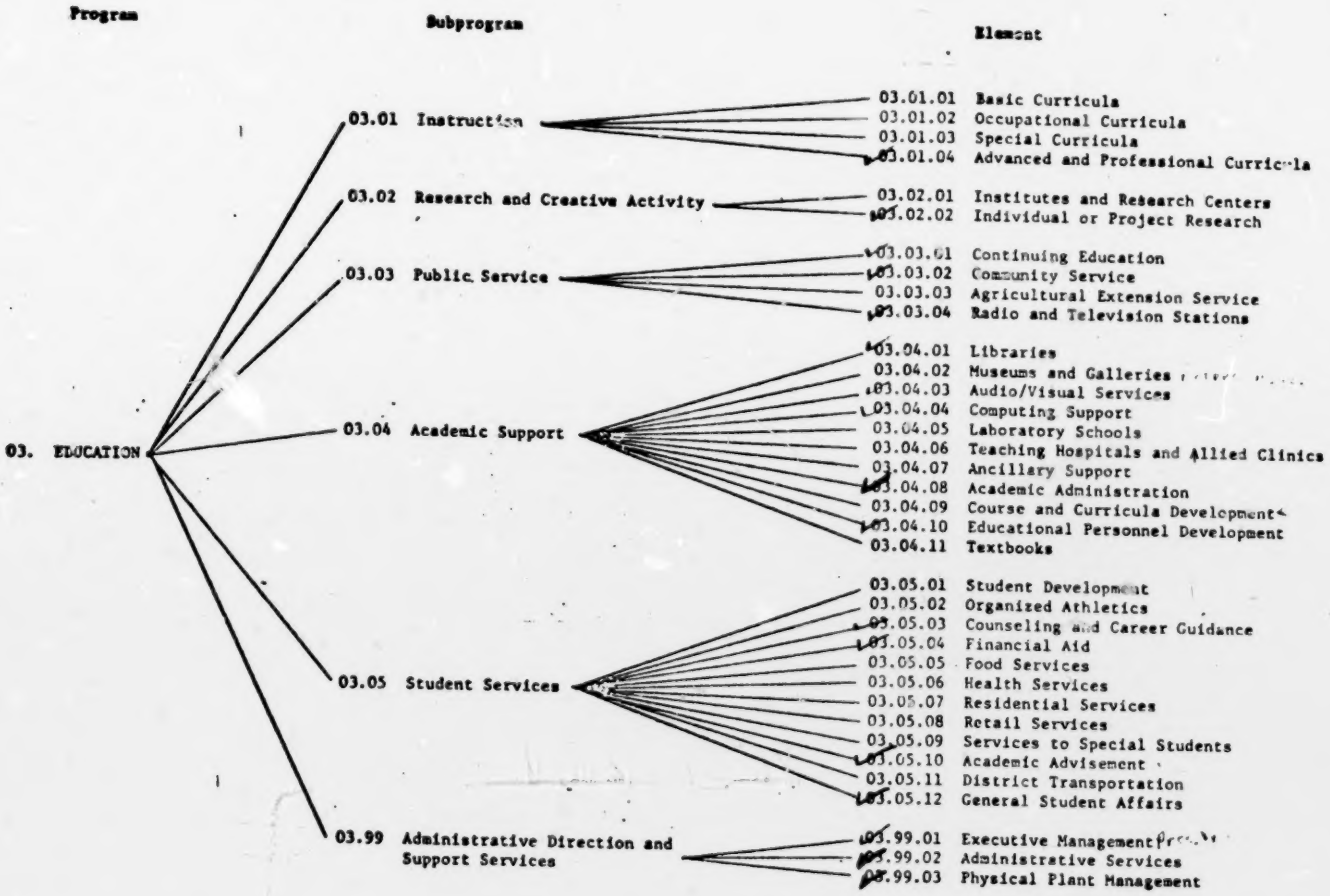
The University Research categories (Creative Activities and Research) relate to those activities which have their focus primarily within the disciplines and which emphasize basic as opposed to applied investigation.

A policy decision is pending concerning Systemwide course numbering for all credit hour work. Until that decision is made, projected graduate enrollments, where applicable, will be broken out in the traditional manner of Beginning Graduate - Advanced Graduate. In our first efforts to move toward a Graduate - Advanced Graduate breakout, each institution, within its assigned total graduate enrollment, should estimate its Graduate - Advanced Graduate student credit hours and support this estimate with all available documentation.

APPENDIX B

STATE PROGRAM STRUCTURE

STATE OF FLORIDA STATE PROGRAM STRUCTURE



03.01 Instruction
- 03.01.01 Basic Curricula
- 03.01.02 Occupational Curricula
- 03.01.03 Special Curricula
- 03.01.04 Advanced and Professional Curricula

03.02 Research and Creative Activity
- 03.02.01 Institutes and Research Centers
- 03.02.02 Individual or Project Research

03.03 Public Service
- 03.03.01 Continuing Education
- 03.03.02 Community Service
- 03.03.03 Agricultural Extension Service
- 03.03.04 Radio and Television Stations

03.04 Academic Support
- 03.04.01 Libraries
- 03.04.02 Museums and Galleries
- 03.04.03 Audio/Visual Services
- 03.04.04 Computing Support
- 03.04.05 Laboratory Schools
- 03.04.06 Teaching Hospitals and Allied Clinics
- 03.04.07 Ancillary Support
- 03.04.08 Academic Administration
- 03.04.09 Course and Curricula Development
- 03.04.10 Educational Personnel Development
- 03.04.11 Textbooks

03.05 Student Services
- 03.05.01 Student Development
- 03.05.02 Organized Athletics
- 03.05.03 Counseling and Career Guidance
- 03.05.04 Financial Aid
- 03.05.05 Food Services
- 03.05.06 Health Services
- 03.05.07 Residential Services
- 03.05.08 Retail Services
- 03.05.09 Services to Special Students
- 03.05.10 Academic Advisement
- 03.05.11 District Transportation
- 03.05.12 General Student Affairs

03.99 Administrative Direction and Support Services
- 03.99.01 Executive Management
- 03.99.02 Administrative Services
- 03.99.03 Physical Plant Management

Definition:

Education is a continuing process of organized learning opportunities designed to advance the knowledge, skill, and competence of Florida citizens. The Education program will ultimately include all resources, both public and private, which are utilized in providing these opportunities. However, the current focus of this program is on the state resources supporting the public system of education from the early childhood through the adult years. Excluded are: (1) apprenticeships, work experience, in-service training, and state agency personnel development except when these activities are part of an organized curriculum; (2) personal adjustment, tutorial and therapeutic training in the habilitation and/or rehabilitation of individuals with categorical social, physical, or mental deficiences unless such training is a direct adjunct of the educational effort; (3) the public museums, libraries, and other cultural facilities, unless in an educational institution; and (4) information endeavors incidental to other programs.

Objective:

To discover, develop, transmit and disseminate knowledge, skills, and competences consistent with the interests, aptitudes, needs and abilities of Florida's citizens.

Subprograms:

03.01 Instruction
03.02 Research and Creative Activity
03.03 Public Service
03.04 Academic Support
03.05 Student Services
03.99 Administrative Direction and Support Services

03.01 INSTRUCTION: Organized learning opportunities for individuals in educational institutions

Definition:

This subprogram encompasses all support of instruction in educational institutions operated by district school boards and community college boards of trustees, and direct instructional services for students in state-operated educational institutions. Persons involved in this endeavor are generally pursuing diplomas, certificates or degrees which indicate a level of competence in the area or field being studied. Excluded are educational undertakings in the Department of Health and Rehabilitative Services.

Objective:

To transmit and disseminate knowledge, skills, and competences to individuals in the state's educational institutions.

Elements:

03.01.01 Basic Curricula
03.01.02 Occupational Curricula
03.01.03 Special Curricula
03.01.04 Advanced And Professional Curricula

03.01.01 BASIC CURRICULA: Organized general education for individuals from early childhood through senior high school

Definition:

This element encompasses the support of an instructional delivery system for the basic skills, health, knowledge of the American heritage, moral and ethical value, social understanding, civic responsibility, preparation for family living, appreciation of the arts, and the natural sciences. It is normally signified by pursuance and/or attainment of a high school diploma or its equivalent. These offerings are found in public schools and institutions, and include clientele in the elementary, intermediate and secondary areas. Excluded are adult education participation in regular basic instruction.

Objective:

To transmit and disseminate basic knowledge, skills and competences which enhance each individuals participation as a member of society.

Budget information should be further subdivided to show specific amounts for the following activities:
Driver Education
Early Childhood
General Academic

03.01.02 OCCUPATIONAL CURRICULA: Organized learning opportunities to prepare individuals for employment

Definition:

This element encompasses the support of an instructional delivery system for specified occupational curricula in educational institutions operated by district school boards and community college boards of trustees, and direct instructional services for students in state-operated educational institutions. This is normally signified by the pursuance of degrees, diplomas and certificates of less than baccalaureate level. Included are clientele groups in public schools, vocational-technical centers, community colleges, the State Fire College, and the Florida School for the Deaf and Blind. Excluded are educational efforts in the Department of Health and Rehabilitative Services.

Objective:

To transmit and disseminate knowledge, skills and competences which enhance the abilities of individuals seeking entry, reentry or advancement in business, industry or government.

03.01.03 SPECIAL CURRICULA: Organized learning opportunities for exceptional or disadvanted individuals

Definition:

This element encompasses the support of an instructional delivery system for special clientele in educational institutions operated by district school boards, community college boards of trustees, and the Trustees of the Florida School for the Deaf and the Blind. These individuals require significantly different services from ea childhood through the adult years. Although these services in many ways parallel other educational efforts, t generally require a larger expenditure of supportive effort for both teacher and learner. Included are adult exceptional child, migrant, compensatory, disadvantaged vocational, and handicapped vocational curricula. The undertakings have been removed from other elements and are placed here to allow a greater focus on the stat role in this area. Excluded are educational efforts in the Department of Health and Rehabilitative Services.

Objective:

To transmit and disseminate knowledge, skills, or attitudes which enhance the potential of gifted, dysfunction disadvantaged, or handicapped individuals.

Budget information should be further subdivided to show specific amounts for the following activities:

Adult Education
Community College Compensatory Education
Exceptional Child Education
Florida School for the Deaf and Blind
Manpower Development & Training
Migrant Adult or Child
Vocational Disadvantaged and Handicapped

03.01.04 ADVANCED AND PROFESSIONAL CURRICULA: Credit instruction in pursuance of approved degrees beyond the high school di

Definition:

This element encompasses the support of an instructional delivery system for advanced and professional educati institutions operated by community college boards of trustees and the state. Included is credit enrollment in pursuance of associate, bachelors, masters or doctors degrees in public community colleges and universities. Included is the cost of special areas of instruction in non-state institutions purchased by the state through Division of Universities. Excluded are: (1) non-credit courses preliminary to work on a baccalaureate or ass degree; (2) courses primarily used in pursuance of occupational programs of less than baccalaureate level; and (3) non-credit individual improvement courses which are not primarily in pursuance of a baccalaureate or assoc degree.

Objective:

To transmit and disseminate knowledge, skills and competences which allow eligible individuals to become pract professionals or to pursue further academic endeavors.

03.02 RESEARCH AND CREATIVE ACTIVITY: Investigation of subjects for the advancement of knowledge and technology

Definition:

This subprogram encompasses all undertakings involving the acquisition or production of new knowledge or new application existing knowledge. Included are identifiable institutional or agency research operations and projects under the terms agreement with external agencies, or separately budgeted and conducted with internal funds. Also included is the "relea time" of individual faculty members for the conduct of personal research. These efforts apply neither creative or scien methods in conducting an investigation of a specified scope as defined by the commissioning agency. They may be found i departments, research divisions, bureaus, institutes and experimental stations, or the Educational Research and Develop Program. Excluded are all public service efforts as defined in Subprogram 03.03.

Objective:

To discover and develop the store of knowledge and understanding through fundamental and applied investigation.

Elements:

03.02.01 Institutes and Research Centers
03.02.02 Individual and Project Research

03.02.01 INSTITUTES AND RESEARCH CENTERS: Organized units for sponsoring, coordinating or conducting research and developme activities

Definition:

This element encompasses formal research organizations created to manage a number of research efforts in speci fields of study. Included are such diverse units as Agricultural Experiment Stations, the Florida Institute o Oceanography, the Educational Research and Development Program, university Centers of Excellence and the Engin ing and Industrial Experiment Stations. Excluded are the research undertakings of regular collegiate departme which offer instruction and public service, individual faculty research and released time activities.

Objective:

To provide for organized programs of research and development which enhance the store of knowledge and technol in disciplines of study.

Budget information should be further subdivided to show specific amounts for the following activities:

Educational Research and Development Program (DESE)
Agricultural Experiment Stations (IFAS)
Engineering and Industrial Experiment Station (UF)
Florida Institute of Oceanography (BOR)
Centers of Excellence (FSU, UF)
Educational Research and Development Center (UWF)

03.02.02 INDIVIDUAL OR PROJECT RESEARCH: Independent investigation of subjects of interest to particular educators

Definition:

This element encompasses the department and individual research undertakings within educational institutions. Included is the "released time" of faculty members for the conduct of personal research and all projects to which the state contributes either direct or indirect support. Excluded are all public service efforts, the activities of organized research units, and research by laboratory school faculty.

Objective:

To provide the opportunity for individual research and development efforts which enhances the store of knowledge and technology and improves the professional performance of an educator.

03.03 PUBLIC SERVICE: Educational services which benefit the general society

Definition:

This subprogram encompasses those resources utilized in making the benefits of instruction and research available to the community or individuals residing within the geographic service area or the agency or institution. Included are continuing education, extension services, short courses, conferences, seminars, workshops and institutes that may be used for credit but are not a part of formal, established curricula. Also included are the Agricultural Extension Service, community schools references bureaus, radio/television stations, cultural activities for the general public, and assistance to various state, professional, and community groups. Excluded are public information services.

Objective:

To make available services which enhance the development of individuals, communities, the state and the nation.

Elements:

03.03.01 Continuing Education
03.03.02 Community Service
03.03.03 Agricultural Extension Service
03.03.04 Radio and Television Stations

03.03.01 CONTINUING EDUCATION: Non-credit enrichment offerings

Definition:

This element encompasses resources utilized for short-term, organized non-credit educational opportunities offered upon demand of the general public in institutions operated by community college boards of trustees and the Board of Regents. Included are short courses, seminars, conferences, workshops, and institutes. Excluded are educational services to all regular students, and agricultural extension.

Objective:

To offer special educational opportunities which improve the cultural and professional life of all citizens.

03.03.02 COMMUNITY SERVICE: Institutional services which benefit the community

Definition:

This element encompasses resources utilized by district school boards, community college boards of trustees and state universities in providing services which are beneficial to groups and individuals in the service area of the educational institution. Included are activities such as community schools, reference bureaus, general advisory services, community cultural and recreation efforts, civic activities, community welfare, etc. Excluded are educational services to all regular students, agricultural extension, radio/tv stations, and public information services.

Objective:

To improve the quality of life within the service area of an educational institution.

03.03.03 AGRICULTURAL EXTENSION SERVICE: Organized units for the improvement of life in rural areas

Definition:

This element encompasses all resources related to the operation of federally supplemented county extension units in agriculture. Included are efforts in improving agriculture and related industries, rural, social and economic development, and rural life. Excluded is instruction and research.

Objective:

To improve the quality of life in rural areas of the state.

03.03.04 RADIO AND TELEVISION STATIONS: Broadcast services in the public interest

Definition:

This element encompasses all resources supporting the provision of educational experiences through public broadc services which are not provided by commercial broadcast media. Included are radio-television broadcasts on com munity problems, student activities, PBS and NET programs, etc. Excluded are audio-visual services as defined i Element 03.04.03.

Objective:

To expand public access to educational opportunities.

03.04 ACADEMIC SUPPORT: Institutional support functions for the advancement of knowledge

Definition:

This subprogram encompasses those separate and identifiable resources or functions related to the primary activities of instruction, research or public service. These services support and supplement the progress and development of both studen and faculty, but cannot be allocated easily to the instruction, research and public service components. Excluded are all public service endeavors and public information services.

Objective:

To facilitate the instructional, research and public service activities of educational institutions.

Elements:

03.04.01 Libraries
03.04.02 Museums and Galleries
03.04.03 Audio/Visual Services
03.04.04 Computing Support
03.04.05 Laboratory Schools
03.04.06 Teaching Hospitals and Allied Clinics
03.04.07 Ancillary Support
03.04.08 Academic Administration
03.04.09 Course and Curricula Development
03.04.10 Educational Personnel Development
03.04.11 Textbooks

03.04.01 LIBRARIES: Collecting and circulating printed materials for the use of educational institutions

Definition:

This element encompasses resources going to districts and institutions for the support and actual operations of a catalogued or otherwise classified collection of published materials within an institution. Excluded are professional library services for the internal use of a state agency, and audio/visual services in an institution.

Objective:

To increase the information resource base available to students, faculty and staff members through the orderly selection, collection, cataloging and circulation of published books, pamphlets, journals, magazines and newspape

03.04.02 MUSEUMS AND GALLERIES: Florida State Museum

Definition:

This element encompasses resources related to the collection, preservation and exhibition of historical materials, art objects, scientific displays, and other objects under study at the Florida State Museum in Gainesville. Excluded are library displays of published materials.

Objective:

To display historical and creative works for the purpose of expanding the cultural understanding of the state.

03.04.03 AUDIO/VISUAL SERVICES: Supportive aids to instruction and public service

Definition:

This element encompasses resources related to the preparation, storage and distribution of equipment, materials and other aids which assist instruction through special appeal to the senses of sight and hearing. Included is closed circuit instructional television. Excluded are radio-television broadcasts as defined in Element 03.03.04

Objective:

To expand the transmission of information in the instructional process through the use of graphic and phonic materials.

... processing for use in academic and administrative areas.

Definition:

This element encompasses all resources related to programming and processing instructional, research and administrative data through the regional data centers. This information will be shown here as a non-add entry. Actual costs are included within elements 03.04.08 and 03.99.02.

Objective:

To expand the capacity and decrease the time required to deal with large amounts of instructional, research, administrative data.

03.04.05 LABORATORY SCHOOLS: Elementary and secondary schools operated by a university

Definition:

This element encompasses resources related to the administration and operation of schools for early childhood through 12th grade on the campuses of Florida A & M University, Florida Atlantic University, Florida State University, and the University of Florida.

Objective:

To improve the operations of regular K-12 schools through educational research, experimentation and innovatio

Budget information should be further subdivided to show specific amounts for the following activities:
- Florida A & M University
- Florida Atlantic University
- Florida State University
- University of Florida

03.04.06 TEACHING HOSPITALS AND ALLIED CLINICS: Non-student patient health care services in universities

Definition:

This element encompasses resources related to the support of patients in the J. Hillis Miller Health Center at University of Florida and the University of South Florida Medical Center. Also included are the Children's Mental Health Unit, outpatient clinics, and the Anatomical Board. Excluded are instruction, research, public service and related support activities in the centers. Also excluded are student health services as defined in 03.05.06.

Objective:

To extend the instructional and research process in health through actual experience.

Budget information should be further subdivided to show specific amounts for the following activities:
- Shands Teaching Hospital
- Children's Mental Health Unit
- Dental Outpatient Clinic
- USFMC Outpatient Clinics
- Anatomical Board

03.04.07 ANCILLARY SUPPORT: Miscellaneous academic support units operated at an educational institution

Definition:

This element encompasses resources for various operational support units which provide general services to the academic programs. Included are Educational and General activities such as farms, Jacksonville nursing and hosp programs, community hospital education, ROTC support and medical academic support units; and all quasi-Auxiliary activities such as stockrooms, photo labs, instrument shops, etc.

Objective:

To provide technical support and supplies for instruction, research, and public service.

Budget information should be further subdivided to show specific amounts for the following activities:
- Farms and Dairies (FAMU)
- Jacksonville Nursing (FAMU)
- Jacksonville Hospitals Education Program (UF)
- Medical Academic Support Units (UF Medical Illustrations, etc.)
- ROTC Support
- Community Hospital Education Program (BOR)

03.04.08 ACADEMIC ADMINISTRATION: The offices of vice-presidents, principals, assistant principals, deans, department heads and academic administrative positions, and support resources.

Definition:

This element encompasses resources utilized in the administration of departments, schools and colleges which undertake instruction, research and/or public service. Included are clerical, secretarial and other support services. Excluded are resources for institutional executive management and state or district operations.

Objective:

To manage resources related to instruction, research and public service.

03.04.09 COURSE AND CURRICULA DEVELOPMENT: Services to districts and institutions to improve instruction.

Definition:

This element encompasses those efforts undertaken to provide expertise to the specific instruction subjects and services in the districts or institutions. Included are efforts directed toward planning, developing and coordinating instructional curricula. University program development resources and veterinary medicine planning are specifically included. Excluded are the resources directly attributable to the instructional subjects or services.

Objective:

To increase the effectiveness of curricula and services in the districts and institutions.

03.04.10 EDUCATIONAL PERSONNEL DEVELOPMENT: Certification, recruitment and training of professional educational personnel

Definition:

This element encompasses federal, state and local resources that establish professional criteria, promote recruitment, and provide training to assure that each individual employed in a professional capacity in an educational institution of the state shall be competent to plan and guide the educational experiences of students. Included in this element are teacher certification, K-12 personnel development, community college staff development, university faculty development and recruiting, recruitment of K-12 education personnel, Professional Practices Council, and the Florida Council on Teacher Education.

Objective:

To improve the quality and competence of educational personnel.

03.04.11 TEXTBOOKS: State textbook services for school districts

Definition:

This element encompasses state resources utilized in selecting and purchasing textbooks and text-related materials for use in local school districts. Excluded are student publications, document reproduction, and public information services.

Objective:

To provide textbooks and publications for use in the public schools.

03.05 STUDENT SERVICES: Institutional services for student support

Definition:

This subprogram encompasses personal services which generally aid the student. These efforts enable a student to more fully participate in the teaching/learning process. Included are student affairs offices, academic advisement, intercollegiate athletics, food, health, housing, state transportation services, and state funding of pupil/student personnel services. Excluded are student admissions, registration and records.

Objective:

To provide services necessary to promote the physical, psychological and social well-being of the students.

Elements:

03.05.01 Student Development
03.05.02 Organized Athletics
03.05.03 Counseling and Career Guidance
03.05.04 Financial Aid
03.05.05 Food Services
03.05.06 Health Services
03.05.07 Residential Services
03.05.08 Retail Services
03.05.09 Services to Special Students
03.05.10 Academic Advisement
03.05.11 District Transportation
03.05.12 General Student Affairs

03.05.01 STUDENT DEVELOPMENT: Social and physical development of the student

Definition:

This element encompasses resources utilized for student government, student publications, student organizations (including vocational youth clubs), student centers, student cultural and social affairs, intramural athletics, and recreation opportunities in educational institutions. The costs associated with the office of the senior executive for student affairs is excluded.

Objective:

To extend the scope of the instructional process through extra-curricular experience and situations.

03.05.09 SERVICES TO SPECIAL STUDENTS: Offices for foreign students, veterans, the disadvantaged and the handicapped

Definition:

This element encompasses resources utilized for support units providing information, forms processing, and assistance to client groups such as veterans, foreign students, disadvantaged, and handicapped. Excluded are financial aid and remedial services.

Objective:

To enable special students to overcome unique problems.

03.05.10 ACADEMIC ADVISEMENT: Individual faculty consultation with students on curricula

Definition:

This element encompasses resources for the continuing activities of faculty members in designing the academic programs of students. Excluded are formal counseling activities in counseling centers, placement bureaus and student health services.

Objective:

To guide students in the selection of appropriate courses and the meeting of curriculum requirements.

03.05.11 DISTRICT TRANSPORTATION: Transportation services for students in public schools and community colleges

Definition:

This element encompasses the state support to school and community college districts utilized for the purchase of buses and driver services. Included are administrative and consultative services.

Objective:

To provide a safe, efficient and economical system of pupil transportation to educational institutions.

03.05.12 GENERAL STUDENT AFFAIRS: Executive offices and general unallocable costs for student affairs

Definition:

This element encompasses resources related to the overall direction of student affairs in districts, community colleges and universities. Included are any funds not directly attributable to student services previously specified and state consultative services provided to these areas.

Objective:

To provide direction for services which directly benefit students in educational institutions.

03.99 ADMINISTRATIVE DIRECTION AND SUPPORT SERVICES: State leadership and administrative services for the educational system

Definition:

This subprogram encompasses those undertakings of the heads of organizational units, their immediate staffs, and policy bodies related to overall state education management. Included are formulation and implementation of policy, liaison with the legislative and other executive branches, planning of programs and services, allocation of resources, evaluation of programs, dissemination of information, investigation and analysis of agency problems, and legal counsel. Also included are centralized support activities related to the management of agency and institutional internal resources including administration of financial resources; provision of qualified personnel; control of facilities and equipment; procurement and handling of goods and services; reproduction and printing of documents; transmission of information; transportation of persons, goods, and services; purchase of data processing services; provision of internal library services; and protection of the agency, its employees, and the general public.

Excluded are state executive functions undertaken by the Office of the Governor, Cabinet officers and their immediate staffs concerned with Cabinet affairs. Also excluded are administrative support services such as purchasing, building and grounds maintenance, building construction, bond financing, and motor pool services provided all departments of the executive branch by a centralized authority.

Objective:

To improve the delivery of agency and institution l services and organizational capabilities to effectively and efficiently maintain accountability and use-control over human and physical resources.

Elements:

03.99.01 Executive Management
03.99.02 Administrative Services
03.99.03 Physical Plant Management

03.99.01 EXECUTIVE MANAGEMENT: Educational policy planning, formulation, interpretation, execution, and evaluation

Definition:

This element encompasses those activities which have as their purpose the general regulation, direction, execut and control of the overall affairs of state educational agencies, institutions and component units. Included a the functions of executive officers (presidents, executive vice-presidents) and their immediate staffs, governi boards, general advisory councils, legal counsel, legislative and executive liaison, school code maintenance, program analysis, program approval, program evaluation, institutionsl research, and communications with the pub which are institution, department or division-wide and not confined to any organizational unit below the divisi or institution level.

Objective:

To exercise leadership in the implementation of established educational policies of the state, and to improve policy based upon review and analysis of ongoing programs.

03.99.02 ADMINISTRATIVE SERVICES: Internal support units for agency, district, or institutional operation

Definition:

This element encompasses agency and institutional activities for monitoring and controlling the operations of agency, districts or institutions. Included are Department of Education efforts to improve management service in school finance, business systems, and institutional operations. Also included are administrative vice-pres and immediate reporting staff except plant operation and maintenance.

Objective:

To maintain accountability and use-control over human, financial and physical resources in order that the orga tion may carry out its planned objectives.

03.99.03 PHYSICAL PLANT MANAGEMENT: Operation and maintenance of the physical plant

Definition:

This element encompasses agency and institutional activities which relate to the management, improvement and functioning of grounds, building services, maintenance, utilities, internal transportation services, renovati and general supervision. Included are Department of Education services to school districts and institutions for architectural planning, educational specifications, school surveys, plant management and other facilities activities. Also included are operating capital outlay for replacement, and working capital operations.

Objective:

To assure that adequate facilities are available for educational agencies and institutions and to insure econ use, maintenance, renovation and replacement of these facilities.

Budget information should be further subdivided to show specific amounts for the following activities:

General Supervision
Facilities Acquisition/Construction Administration
Grounds Maintenance
Custodial Services
Building Maintenance
Transportation & Vehicle Maintenance
Utilities
Facilities Alteration/Renovation
Operating Capital Outlay for Replacement
Working Capital Operations
Facility Development & Management Services to School Districts and Institutions (DESE)

STUDENT INSTRUCTOR-COURSE EVALUATION -- A FACTOR ANALYSIS AND MULTIVARIATE ANALYSIS OF VARIANCE STUDIES

October, 1972

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STUDENT INSTRUCTOR-COURSE EVALUATION --

A FACTOR ANALYSIS AND MULTIVARIATE ANALYSIS

OF VARIANCE STUDY

Statement of Problems

Many studies of evaluation of instructors and courses have been completed over the past decades. More recent studies have been structured around the student's evaluation of instructor effectiveness and course meaningfulness through the utilization of questionnaires (e.g., Gustad, 1967, Werdell, 1967; McKeachie, 1957; McKeachie and Solomon, 1958; Carney and McKeachie, 1966; Hartley and Hogan, 1972; and Costin, 1971).

Results of such evaluations are utilized by future students to select courses and instructors, administrators to promote and reward instructors, and by instructors to improve the quality of teaching and/or modify the course content.

The purposes of this study were to determine the construct validity and reliability of the items on the Florida Atlantic University Course and Instructor Evaluation Questionnaire, identify constructs with factor analysis and compare levels of independent variables of reported cumulative grade point average, college, class standing, reasons of selecting course, major, and instructor evaluations through multivariate analysis of variance.[1]

Method and Sample

The Florida Atlantic University Course and Instructor Evaluation Questionnaire was administered at the end of the Winter Term, 1972. Anonymous ratings were requested in an attempt to obtain valid responses. From 461 surveyed class sections, a stratified random sample of 56 sections was selected for analyses. Stratification was percentage of students by class level by college. The questionnaire consisted of 21 items. Three items were solely student oriented and college or course oriented. Five items were course oriented with one item having a dual orientation. Eleven items relate to the instructor and one item relates to teaching assistants.

1. See Questionnaire in Appendix A

It should be noted that questionnaire item scales of cumulative grade point average, sufficient examples, stimulate thinking, and free to express ideas are reversed when compared to the other questionnaire items. Because of this reversal the sign of the correlation coefficient for the preceding four questionnaire items was changed.

Approximately 3396 questionnaires were available for analysis after sampling. Since all students did not answer all items, statistical programs to process unequal number of responses were used. Thus, the actual responses for various items ranged from 3313 to 3396.

Factor Analysis

The factor analysis was completed by a principal-axis analysis and followed by varimax rotation of factor-loadings. Eigenroots equal to or greater than one were extracted.

Results and Discussion

Factor Analysis

The factor loading matrix with the five factors, percent communalities, percent trace, and questionnaire item descriptions appear in Table 1.

Factor Analysis with unity as the cutoff point of extracting the eigenroots identified five factors. The five factors accounted for 58.51 percent of the total variance.

Factor I could be labeled overall evaluation/teaching style[2]. The questionnaire items which define the first construct are overall instructor evaluation; overall course evaluation; class discussion; lecture benefit; freedom to question, disagree, and express ideas; stimulate thinking; examples and illustrations; clear and coherent presentation; and educational value.

It is interesting to note that students perceive teaching style or skill and evaluation of course and instructor as the same entity. Hartley and Hogan (1972) also found that "students" perception of style of presentation will be closely reflected in their overall evaluation of the course.

2. See Table 2

TABLE 1

FACTOR LOADING MATRIX, AND BRIEF DESCRIPTION OF VARIABLES

Questionnaire Items	FACTORS[a] I	II	III	IV	V	Communality	Item Description
1	-.0156	-.0743	-.0768	.7592	.0902	.596	Cumulative GPA
2	.1695	.0366	.0072	.7830	-.0203	.647	Expected Grade
3	.7055	.1833	.0872	.1871	.1499	.597	Educational Value
4	.8259	.1208	-.0116	.0988	-.0458	.709	Clear, Coherent Presentation
5	.4047	.0089	.2696	.1242	-.3838	.399	Examples, Illustrations
6	.7840	.0455	-.0175	.0435	.1823	.652	Stimulate Thinking
7	.6274	.0263	-.2071	-.0099	.1909	.474	Free to Question, Disagree, and Express Ideas
8	.6592	.3292	.0064	.0392	-.0740	.550	Lecture Benefit
9	.1831	.5030	.0725	.1264	.4369	.499	Texts and Readings Benefit
10	.6231	.1385	-.0468	-.0229	.2699	.483	Class Discussion
11	.2617	.0033	.1748	-.0774	.5403	.397	Out-of-class Assistance
12	.2021	.8186	.0283	-.0426	-.0033	.713	Examinations/Quizzes
13	.0593	-.1392	.7358	.0295	.1625	.591	Labs, Field trips
14	.1398	-.0702	.0432	.2276	.6816	.543	Written Papers
15	-.1450	.1968	.6696	-.1045	-.0192	.519	Grad Teaching Assistant
16	.1945	.7802	-.0375	-.0119	-.0923	.657	Fairness of Grading Procedure
17	.8257	.2052	.0430	.1406	.0847	.753	Overall Course Evaluation
18	.8554	.1262	-.0047	.0331	.0663	.753	Overall Instructor Evaluation

Percent of trace extracted by five roots - 58.51

[a] The underlined factor loadings identify the questionnaire items defining each factor.

TABLE 2

CONSTRUCTS AND DEFINING QUESTIONS

Questionnaire Items	CONSTRUCTS		
	I Overall Evaluation And Teaching Style	II Course Structure	III Support Service
	3-Educational value 4-Clear, Coherent Presentation 5-Examples, Illustrations 6-Stimulate Thinking 7-Free to Question, Disagree and Express Ideas 8-Lecture Benefit 10-Class Discussion 17-Overall Course Evaluation 18-Overall Instructor Evaluation	9-Texts and Reading Benefit 12-Examinations and Quizzes 16-Fairness of Grading Procedure	13-Lab and Field Trips 15-Grad. Teaching Assistant
	IV Self Evaluation	V Outside Class Activities	
	1-Cumulative GPA 2-Expected Grade	11-Out-of-Class Assistance 14-Written Papers	

Factor II might be labeled course structure. The questions of helpfulness of text and readings, helpfulness of examination and quizzes, and fairness of grading procedures defined this construct. Examinations and quizzes are generally developed from course objectives. Texts and readings concur with course objectives, and provide basic course structure and content. There is agreement between this factor and Hartley's (1972) factor IV.

Support service was the label given Factor III which has questionnaire Items 13 (laboratory and field trip helpfulness) and 15 (helpfulness of graduate teaching assistants).

Factor IV deals with the student's cumulative grade point average and expected course grade. This construct was labeled self evaluation. Cumulative grade point average was reported by the student.

Factor V could be labeled outside activities. It indicates the helpfulness of written papers and out-of-class assistance.

Cummunality is a measure of the construct validity and a conservative estimate of the construct reliability. Each questionnaire item has listed a validity and conservative reliability estimate in Table 1, Communality.

Multivariate Analysis

A multivariate analysis of variance (MANOVA, Clyde) program was utilized to determine whether or not significant differences existed among levels of the independent variables when questionnaire items were the dependent measures.

Seven one factor multivariate analyses of variance analysis were completed to test the following hypotheses when utilizing other questionnaire items as the dependent variables.

There is no significant difference among the colleges offering courses.

There is no significant difference among students reported major college.

. There is no significant difference among course levels.

4. There is no significant difference among students' levels of class standing.

5. There is no significant difference among students' levels of cumulative grade point average.

6. There is no significant difference among students' reasons for enrolling in courses.

7. There is no significant difference among levels of evaluation of instructors.

It was stated in Hypothesis I that there would be no significant difference among colleges offering courses when considering the dependent measures of questionnaire items. The colleges were Business and Public Administration, Education, Engineering, Humanities, Science, and Social Science. The multivariate test statistic, Wilks Lambda, was interpreted as a significant difference. A probability level of 0.05 or less was considered significant. Therefore, the hypothesis of a common mean vector of colleges is rejected. Univariate F-tests were completed to determine which questionnaire items supported the multivariate findings. Associated with each questionnaire item is a null hypothesis of no significant difference among colleges offering courses. All but one univariate F-test resulted in rejection of the null hypothesis. These data are presented in Table 3.

The interpretation of the significant differences required that each questionnaire items' mean and standard deviation by college be investigated.[3]

The range of means by college by item are small. Following are the response scale interpretation of the range by item: cumulative grade point average, 2.36 to 2.72 (actual GPA 'C'); expected grade in course, 'A-' to 'B+'; educational value of course, great value; clear and coherent presentation, very clear· examples and illustrations, not enough; stimulate thinking, fairly often to infrequently; freedom to question, disagree and express ideas, fairly often; lectures, helpful; texts and readings, helpful; and class discussion, helpful; labs and field trips, almost no help; written papers, little help to almost no help; graduate teaching assistants, little help to almost no help; fairness in grading, fair; overall course evaluation, above average; and overall

3. See Table 4

TABLE 3

TEST OF COLLEGE MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 5	18.500	90.000	15024.065	.001
2 Through 5	12.036	68.000	12178.640	.001
3 Through 5	7.981	48.000	9228.675	.001
4 Through 5	5.273	30.000	6195.000	.001
5 Through 5	3.723	14.000	3098.000	.001

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	.P LESS THAN
CUM GPA	26.143	.001
EXP GRADE	28.872	.001
ED VALUE	13.146	.001
CLEAR COHE	14.819	.001
EXAMPLES	5.409	.001
STIM THINK	17.250	.001
EXPRES IDEAS	20.323	.001
LECTURE	.818	.537
TEXT	7.858	.001
DISCUSSION	28.634	.001
OUT CLASS	16.046	.001
EXAM QUIZ	10.516	.001
LABS FIELD	45.129	.001
WRITE PAP	58.436	.001
TCH ASSIST	75.661	.001
GRADING PR	12.899	.001
COURS EVAL	10.740	.001
INST EVAL	14.688	.001

TABLE 4

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS
BY COLLEGE OFFERING COURSES[1]

Item	COLLEGE											
	BA		ED		ENGR		HU		SC		SS	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	2.96	1.08	3.46	0.99	3.00	1.05	3.28	1.08	3.07	1.10	2.77	1.04
Expected Grade	1.74	0.70	1.80	0.70	2.21	0.83	1.87	0.78	2.07	0.90	2.18	0.75
Ed'l Value	2.57	1.08	2.40	1.10	2.58	0.88	2.34	1.02	2.66	0.96	2.81	0.97
Clear Coherent	2.47	1.08	2.20	1.04	2.58	0.92	2.19	1.03	2.58	1.00	2.44	0.96
Examples	2.87	0.56	2.89	0.51	2.80	0.46	2.93	0.46	2.85	0.49	2.99	0.47
Stimulate Think	2.97	0.89	3.25	0.90	2.95	0.73	3.21	0.84	2.93	0.80	2.89	0.85
Express Ideas	3.19	0.99	3.46	0.78	3.26	0.82	3.57	0.74	3.33	0.82	3.13	1.02
Lecture	2.13	1.08	2.12	1.16	2.13	0.93	2.09	1.24	2.02	0.99	2.09	1.02
Text & Rdgs	2.27	0.96	2.24	1.19	2.27	1.15	2.19	1.13	2.46	1.06	2.05	0.77
Discussion	2.36	1.24	2.08	1.09	2.36	1.16	2.05	1.11	2.77	1.32	2.28	1.04
Outside Asstce	3.55	1.60	3.10	1.70	2.98	1.65	3.34	1.72	3.73	1.54	3.85	1.54
Exam/Quiz	2.76	1.17	3.00	1.30	2.41	1.00	2.95	1.37	2.72	1.03	2.59	0.95
Labs/Field	4.88	0.58	3.95	1.57	4.53	1.19	4.41	1.28	4.27	1.26	4.27	1.41
Written Papers	3.37	1.48	3.06	1.45	3.95	1.43	3.24	1.62	4.26	1.30	4.05	1.41
Tchg Asst	4.48	1.09	4.71	0.93	4.91	0.48	2.05	0.98	2.65	0.88	2.50	0.99
Grading Pract	2.12	1.15	2.50	1.45	4.77	0.83	2.30	1.37	2.37	1.07	2.00	1.01
Course Eval	2.66	1.14	2.42	1.15	4.04	1.38	2.02	1.02	2.66	1.08	2.31	0.98
Instructor Eval	2.30	1.12	2.02	1.04	3.56	1.68	2.03	0.92	2.75	1.00	2.33	1.01

1. See Questionnaire -- Appendix A

instructor evaluation, above average. The foregoing response scale categories associated with each mean by level indicates that even though statistically there is a significant difference it may be of little importance because the means generally associate with only one scale response category, i.e., all colleges on the item of class discussion had mean that fell into the response category of "helpful". Also, the validity of items labs and field trips, written papers, and graduate teaching assistants could be questioned because many courses do not include these activities or assistants. The investigation of the students' major college effect, Hypothesis 2, indicates that there is a significant difference. These results and the item means and standard deviations appear in Table 5 and 6 respectively. Even though there is a statistically significant difference, it appears to be unimportant because almost all means by major fell into the same response category.

Hypothesis 3 investigated the main effect of course level. The multivariate analysis of variance test statistics was interpreted as a significant difference; therefore, the hypothesis of a common mean vector among the course levels (300, 400, 500, 600, 700) is rejected.[4] Univariate F-tests using the dependent variable of each questionnaire item was interpreted to reject the null hypothesis of no significant difference except the questionnaire item of sufficient number of examples.

The response scale means and standrad deviations of items by course level appear in Table 8. The data were interpreted to suggest linearity of means across course levels. As the course level increased the mean values increased from low to high on the following items: cumulative grade point average, expected grade, educational value, clear and coherent presentation, examples, stimulate thinking, free to express ideas, text and readings, class discusison, out-of-class assistance, written papers, course evaluation and instructor evaluation. Inversely related to course level were items related to exam/quizzes, grading practice, and graduate teaching assistants.

The significant course level effect with the seemingly linearity across course levels suggests that multivariate analysis of covariance be utilized for future investigation. Course level would be the concommitant variable which may account for much of the variance; thus, reducing the differences among the levels of the independent variables.

4. See Table 7

Hypotheses 4, 5, and 6 were rejected. There is a significant difference among the levels of class standing, the levels of cumulative grade point average and categories of reasons for enrolling. The multivariate analysis of variance results and scale means and standard deviations associated with the three hypotheses appear in Tables 9, 10, 11, 12, 13 and 14. The interpretation of the significant differences associated with Hypotheses 4, 5, and 6 is similar to that of Hypotheses 1 and 2. Statistically there is a significant difference, but most of the scale means of each item by level fell within the same scale response category. Therefore, the significant difference seems not too important because of response being nearly in the same category.

The multivariate test of significance was interpreted to reject Hypothesis 7 that there is no significant difference among the five levels of student's evaluation of instructors. The five levels of instructor evaluation were superior, above average, average, below average and poor. The tests of significance are presented in Table 15. Two univariate F-tests using the dependent measures of cumulative grade point average and labs and field trips were interpreted to support the null hypotheses of no significant difference, but all other dependent measures of expected grade, educational value, clear coherent presentations, examples, stimulate thinking, express ideas freely, lectures, tests and readings, discussion, out-of-class assistance, exams and quizzes, written papers, teaching assistants, grading practice, and course evaluation resulted in the rejection of the univariate null hypothesis.

Table 16 contains the data summary of scale means and standard deviations by questionnaire item by level of instructor evaluation. The means across levels of instructor evaluation suggest linearity. In general, as the evaluation level of instructors decreases from superior to poor the scale means decrease from higher esteem to lower esteem.

The multivariate analyses results leads the investigator to believe that there may be an interaction between course level and the level of instructor's evaluation. This assumption will be investigated in further data analyses.

TABLE 5

TEST OF MAJOR MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 5	11.570	90.000	15014.362	.001
2 Through 5	8.434	68.000	12170.776	.001
3 Through 5	6.141	48.000	9222.716	.001
4 Through 5	2.913	30.000	6191.000	.001
5 Through 5	2.029	14.000	3096.000	.001

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	P LESS THAN
CUM GPA	21.148	.001
EXP GRADE	8.051	.001
ED VALUE	4.665	.001
CLEAR COHE	3.225	.007
EXAMPLES	3.497	.004
STIM THINK	6.956	.001
EXPRES IDEAS	7.661	.776
LECTURE	.501	.001
TEXT	17.007	.001
DISCUSSION	11.572	.001
OUT CLASS	7.431	.001
EXAM QUIZ	11.301	.001
LABS FIELD	47.190	.001
WRITE PAP	32.217	.001
TCH ASSIST	25.338	.001
GRADING PR	17.714	.001
COURS EVAL	2.435	.033
INST EVAL	5.481	.001

TABLE 6

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS BY STUDENTS' REPORTED MAJOR COLLEGE[1]

Item	COLLEGE											
	BA		ED		ENGR		HU		SC		SS	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	2.94	1.07	3.38	1.01	2.90	1.05	3.31	1.10	3.10	1.14	2.90	1.05
Expected Grade	1.80	0.72	1.94	0.78	2.06	0.85	1.89	0.80	1.94	0.87	2.04	0.78
Ed'l Value	2.60	1.08	2.47	1.06	2.67	0.91	2.36	1.06	2.59	0.96	2.59	0.97
Clear Coherent	2.41	1.06	2.34	1.06	2.46	0.99	2.25	1.07	2.51	0.96	2.42	1.03
Examples	2.89	0.52	2.90	0.50	2.76	0.49	2.89	0.50	2.91	0.49	2.95	0.49
Stimulate Think	3.00	0.87	3.12	0.90	2.86	0.78	3.21	0.86	3.00	0.80	3.00	0.81
Express Ideas	3.27	0.95	3.39	0.84	3.24	0.87	3.56	0.76	3.29	0.89	3.28	0.89
Lecture	2.10	1.08	2.14	1.12	2.08	1.06	2 08	1.24	2.04	1.02	2.07	1.02
Text & Rdgs	2.26	0.95	2.22	1.10	2.85	1.15	2.23	1.24	2.28	1.03	1.97	0.77
Discussion	2.29	1.22	2.17	1.08	2.55	1.30	2.19	1.21	2.65	1.35	2.31	1.05
Outside Asstce	3.57	1.61	3.31	1.65	3.42	1.65	3.20	1.77	3.62	1.59	3.79	1.59
Exam/Quiz	2.72	1.14	2.94	1.24	2.52	1.02	3.08	1.38	2.68	1.10	2.67	1.07
Labs/Field	4.85	0.67	4.06	1.47	4.50	1.18	4.46	1.26	4.12	1.41	4.26	1.40
Written Papers	3.52	1.51	3.19	1.48	4.39	1.23	3.35	1.62	4.00	1.44	3.74	1.52
Tchg Asst	4.41	1.21	4.56	1.06	4.80	0.72	4.61	1.05	4.14	1.37	3.86	1.53
Grading Pract	2.06	1.12	2.50	1.37	1.89	0.89	2.29	1.38	2.07	1.07	2.07	1.05
Course Eval	2.63	1.11	2.53	1.16	2.62	0.93	2.42	1.12	2.61	1.05	2.56	1.05
Instructor Eval	2.24	1.09	2.15	1.06	2.35	1.02	2.00	1.04	2.30	1.00	2.27	0.98

1. See Questionnaire -- Appendix A

TABLE 7

TEST OF COURSE LEVEL MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 4	17.279	72.000	12180.573	.001
2 Through 4	5.284	51.000	9230.155	.001
3 Through 4	3.439	32.000	6196.000	.001
4 Through 4	3.038	15.000	3098.500	.001

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	P LESS THAN
CUM GPA	93.381	.001
EXP GRADE	25.322	.001
ED VALUE	36.990	.001
CLEAR COHE	9.931	.001
EXAMPLES	1.835	.119
STIM THINK	27.950	.001
EXPRES IDEAS	29.156	.001
LECTURE	3.188	.013
TEXT	18.832	.001
DISCUSSION	34.612	.001
OUT CLASS	16.227	.001
EXAM QUIZ	21.532	.001
LABS FIELD	22.452	.001
WRITE PAP	74.897	.001
TCH ASSIST	9.275	.001
GRADING PR	18.736	.001
COURS EVAL	36.342	.001
INST EVAL	9.153	.001

TABLE 8

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS BY COURSE LEVEL[1]

Item	Course Level									
	300		400		500		600		700	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	2.91	1.05	3.07	1.04	3.45	1.03	4.16	0.82	4.43	0.65
Expected Grade	2.01	0.79	1.89	0.77	1.83	0.82	1.52	0.62	1.29	0.47
Ed'l Value	2.77	1.03	2.37	1.02	2.30	1.00	2.23	0.95	1.93	0.92
Clear Coherent	2.49	1.03	2.35	1.06	2.31	1.08	2.11	0.92	1.79	0.70
Examples	2.87	0.53	2.91	0.51	2.88	0.42	2.95	0.41	3.00	0.40
Stimulate Think	2.89	0.84	3.14	0.87	3.19	0.85	3.37	0.81	3.57	0.16
Express Ideas	3.20	0.94	3.39	0.85	3.60	0.75	3.71	0.65	4.07	0.27
Lecture	2.10	1.07	2.13	1.12	1.85	0.97	2.14	1.24	1.79	0.89
Text & Rdgs	2.40	1.02	2.23	1.12	1.87	0.86	2.00	1.00	1.57	0.51
Discussion	2.54	1.25	2.24	1.18	2.02	0.96	1.75	0.93	1.21	0.43
Outside Asstce	3.70	1.55	3.34	1.68	3.24	1.73	3.02	1.72	2.43	1.60
Exam/Quiz	2.72	1.07	2.80	1.26	2.62	1.14	3.36	1.37	4.00	1.66
Labs/Field	4.60	1.00	4.19	1.45	4.61	1.10	4.38	1.35	3.56	1.74
Written Papers	3.96	1.36	3.37	1.57	3.23	1.60	2.40	1.36	3.79	1.53
Tchg Asst	4.30	1.27	4.46	1.17	4.56	1.10	4.72	0.92	3.86	1.66
Grading Pract	2.11	1.04	2.19	1.27	2.07	1.27	2.71	1.59	3.57	1.99
Course Eval	2.80	1.08	2.42	1.09	2.32	1.09	2.16	1.01	1.86	0.95
Instructor Eval	2.31	1.04	2.16	1.07	2.10	1.05	1.94	0.98	1.71	0.83

1. See Questionnaire -- Appendix A

TABLE 9

TEST OF CLASS STANDING MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 4	10.276	72.000	12176.640	.001
2 Through 4	2.035	51.000	9227.175	.001
3 Through 4	1.551	32.000	6194.000	.025
4 Through 4	1.080	15.000	3097.500	.389

UNIVARIATE F TESTS

VARIABLE	F(5,3113)	P LESS THAN
CUM GPA	101.017	.001
EXP GRADE	32.274	.001
ED VALUE	9.529	.001
CLEAR COHE	8.882	.001
EXAMPLES	5.696	.001
STIM THINK	11.168	.001
EXPRES IDEAS	16.474	.001
LECTURE	.905	.460
TEXT	4.677	.001
DISCUSSION	15.557	.001
OUT CLASS	7.864	.001
EXAM QUIZ	8.994	.001
LABS FIELD	3.809	.004
WRITE PAP	32.501	.001
TCH ASSIST	3.250	.011
GRADING PR	10.875	.001
COURS EVAL	12.494	.001
INST EVAL	6.547	.001

TABLE 10

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS
BY STUDENTS' REPORTED CLASS STANDING[1]

Item	Class Standing									
	Junior		Senior		Beginning Graduate		Advanced Graduate		Other	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	2.88	1.09	3.10	0.95	3.73	0.97	4.25	0.83	3.36	1.18
Expected Grade	2.05	0.78	1.85	0.77	1.66	0.70	1.51	0.63	1.94	0.89
Ed'l Value	2.63	1.04	2.52	1.06	2.33	0.97	2.22	0.93	2.51	1.06
Clear Coherent	2.45	1.08	2.40	1.04	2.24	0.96	2.02	0.81	2.35	0.94
Examples	2.86	0.54	2.91	0.50	2.86	0.45	3.01	0.34	2.96	0.37
Stimulate Think	2.98	0.85	3.04	0.87	3.28	0.78	3.34	0.83	3.08	0.88
Express Idea	3.29	0.91	3.29	0.89	3.71	0.66	3.64	0.71	3.39	0.82
Lecture	2.08	1.08	2.13	1.10	2.06	1.13	2.02	1.13	2.17	1.19
Text & Rdgs	2.29	1.03	2.29	1.08	2.07	0.99	2.03	1.08	2.20	1.17
Discussion	2.41	1.24	2.34	1.20	1.90	1.01	1.86	0.96	2.35	1.26
Outside Asstce	3.57	1.64	3.45	1.63	3.06	1.66	3.10	1.74	3.80	1.56
Exam/Quiz	2.72	1.13	2.90	1.20	2.89	1.30	3.24	1.40	2.92	1.10
Labs/Field	4.49	1.18	4.41	1.25	4.30	1.39	4.31	1.38	4.07	1.47
Written Papers	3.82	1.45	3.45	1.52	2.96	1.56	2.82	1.55	3.58	1.61
Tchg Asst	4.36	1.25	4.43	1.20	4.54	1.11	4.64	0.99	4.36	1.25
Grading Pract	2.09	1.10	2.23	1.23	2.37	1.40	2.63	1.59	2.06	1.11
Course Eval	2.66	1.10	2.56	1.11	2.29	1.07	2.17	0.98	2.57	1.08
Instructor Eval	2.23	1.04	2.25	1.09	1.98	0.97	1.93	0.95	2.17	0.98

1. See Questionnaire -- Appendix A

TABLE 11

TEST OF CUMULATIVE GRADE POINT AVERAGE MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 4	6.692	68.000	12159.743	.001
2 Through 4	1.293	48.000	9225.547	.084
3 Through 4	.830	30.000	6198.000	.730
4 Through 4	.636	14.000	3099.500	.837

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	P LESS THAN
CUM GPA	77.641	.001
EXP GRADE	4.168	.002
ED VALUE	2.258	.061
CLEAR COHE	.180	.949
EXAMPLES	3.257	.011
STIM THINK	5.863	.001
EXPRES IDEAS	.431	.736
LECTURE	4.717	.001
TEXT	1.813	.123
DISCUSSION	1.166	.324
OUT CLASS	6.950	.001
EXAM QUIZ	5.502	.001
LABS FIELD	11.904	.001
WRITE PAP	5.743	.001
TCH ASSIST	2.957	.019
GRADING PR	3.472	.008
COURS EVAL	1.537	.189
INST EVAL		

TABLE 12

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS BY STUDENTS' REPORTED CUMULATIVE GRADE POINT AVERAGE CATEGORY[1]

Item	Cumulative Grade Point Average									
	1 Below 2.00		2 2.00-2.49		3 2.50-2.99		4 3.00-3.49		5 3.50-Above	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Expected Grade	2.20	0.85	2.14	0.75	1.97	0.79	1.76	0.75	1.39	0.56
Ed'l Value	2.68	1.09	2.61	1.04	2.53	1.01	2.53	1.07	2.36	1.01
Clear Coherent	2.45	0.96	2.44	1.01	2.38	1.05	2.38	1.08	2.45	1.02
Examples	2.86	0.56	2.90	0.51	2.89	0.51	2.90	0.50	2.88	0.48
Stimulate Think	2.95	0.83	3.02	0.86	3.02	0.87	3.08	0.86	3.18	0.86
Express Idea	3.26	0.91	3.30	0.91	3.32	0.88	3.35	0.89	3.55	0.83
Lecture	2.11	1.14	2.06	1.06	2.11	1.08	2.12	1.12	2.09	1.16
Text & Rdgs	2.26	1.06	2.30	1.02	2.31	1.10	2.26	1.07	2.04	0.98
Discussion	2.36	1.19	2.36	1.19	2.35	1.21	2.30	1.20	2.17	1.25
Outside Asstce	3.55	1.61	3.54	1.59	3.49	1.64	3.42	1.70	3.35	1.68
Exam/Quiz	2.64	1.18	2.71	1.10	2.78	1.17	2.84	1.25	3.08	1.29
Labs/Field	4.41	1.26	4.54	1.11	4.28	1.36	4.42	1.24	4.51	1.19
Written Papers	3.77	1.53	3.78	1.44	3.50	1.53	3.50	1.53	3.16	1.61
Tchg Asst	4.18	1.39	4.34	1.29	4.38	1.23	4.51	1.11	4.58	1.03
Grading Pract	2.03	1.03	2.12	1.13	2.21	1.21	2.21	1.26	2.35	1.42
Course Eval	2.59	1.07	2.64	1.08	2.58	1.11	2.55	1.10	2.38	1.12
Instructor Eval	2.26	1.03	2.24	1.05	2.20	1.04	2.21	1.08	2.08	1.03

1. See Questionnaire -- Appendix A

TABLE 13

TEST OF REASON FOR ENROLLING MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 3	4.695	54.000	9183.960	.001
2 Through 3	2.183	34.000	6165.000	.001
3 Through 3	1.114	16.000	3083.000	.335

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	P LESS THAN
CUM GPA	4.431	.004
EXP GRADE	12.451	.001
ED VALUE	40.596	.001
CLEAR COHE	14.384	.001
EXAMPLES	4.524	.004
STIM THINK	14.964	.001
EXPRES IDEAS	13.786	.001
LECTURE	12.682	.001
TEXT	9.179	.001
DISCUSSION	5.484	.001
OUT CLASS	6.041	.001
EXAM QUIZ	1.737	.157
LABS FIELD	2.903	.034
WRITE PAP	6.685	.001
TCH ASSIST	.511	.675
GRADING PR	1.442	.229
COURS EVAL	35.582	.001
INST EVAL	17.025	.001

TABLE 14

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS BY STUDENTS' REPORTED REASON FOR ENROLLING IN COURSES[1]

Item	Reason For Enrolling							
	Interest		Required		Fit Schedule		Other	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	3.24	1.10	3.08	1.08	3.21	0.95	3.07	1.09
Expected Grade	1.78	0.72	1.93	0.78	2.11	0.92	2.11	0.88
Ed'l Value	2.20	0.90	2.61	1.05	2.88	1.06	2.95	1.03
Clear Coherent	2.18	0.96	2.44	1.05	2.61	1.04	2.57	1.08
Examples	2.95	0.42	2.87	0.52	2.95	0.57	2.89	0.55
Stimulate Think	3.22	0.80	3.01	0.88	2.82	0.88	2.91	0.83
Express Idea	3.52	0.77	3.30	0.91	3.15	0.98	3.30	0.81
Lecture	1.88	1.06	2.15	1.11	2.26	1.04	2.18	1.05
Text & Rdgs	2.08	1.06	2.32	1.06	2.33	0.91	2.27	0.97
Discussion	2.16	1.18	2.36	1.22	2.45	1.08	2.32	1.11
Outside Asstce	3.47	1.71	3.46	1.63	4.07	1.42	3.29	1.66
Exam/Quiz	2.78	1.28	2.80	1.17	3.04	1.19	2.82	1.06
Labs/Field	4.31	1.38	4.44	1.21	4.60	1.01	4.46	1.17
Written Papers	3.33	1.61	3.63	1.49	3.59	1.43	3.57	1.56
Tchg Asst	4.40	1.25	4.43	1.18	4.35	1.24	4.34	1.33
Grading Pract	2.16	1.30	2.19	1.19	2.40	1.22	2.27	1.18
Course Eval	2.21	0.98	2.65	1.12	2.82	1.05	2.84	1.06
Instructor Eval	1.99	0.98	2.25	1.06	2.52	1.09	2.419	1.01

1. See Questionnaire -- Appendix A

TABLE 15

TEST OF EVALUATION OF INSTRUCTOR MAIN EFFECT

MULTIVARIATE TESTS OF SIGNIFICANCE
USING WILKS LAMBDA CRITERION

TEST OF ROOTS	F	DFHYP	DFERR	P LESS THAN
1 Through 4	66.466	68.000	12159.749	.001
2 Through 4	3.501	48.000	9225.547	.001
3 Through 4	1.305	30.000	6198.000	.123
4 Through 4	.875	14.000	3099.500	.586

UNIVARIATE F TESTS

VARIABLE	F(5, 3113)	P LESS THAN
CUM GPA	2.115	.076
EXP GRADE	29.793	.001
ED VALUE	409.106	.001
CLEAR COHE	835.352	.001
EXAMPLES	54.701	.001
STIM THINK	612.078	.001
EXPRES IDEAS	266.460	.001
LECTURE	370.720	.001
TEXT	49.077	.001
DISCUSSION	260.491	.001
OUT CLASS	60.398	.001
EXAM QUIZ	71.414	.001
LABS FIELD	1.561	.182
WRITE PAP	22.178	.001
TCH ASSIST	5.596	.001
GRADING PR	66.728	.001
COURS EVAL	1041.098	.001
INST EVAL		

TABLE 16

SCALE MEANS AND STANDARD DEVIATIONS OF ITEMS BY LEVEL OF INSTRUCTOR'S EVALUATION[1]

Item	Instructor's Evaluation									
	Superior		Above Average		Average		Below Average		Poor	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Cumulative GPA	3.18	1.11	3.13	1.06	3.04	1.08	3.04	1.13	3.16	1.01
Expected Grade	1.71	0.72	1.90	0.76	2.08	0.79	2.16	0.87	2.00	0.93
Ed'l Value	1.82	0.86	2.43	0.78	3.01	0.85	3.56	0.99	4.13	1.00
Clear Coherent	1.54	0.66	2.23	0.66	2.97	0.79	3.70	0.97	4.34	0.89
Examples	2.98	0.28	2.96	0.33	2.82	0.60	2.61	0.83	2.50	1.08
Stimulate Think	3.68	0.59	3.20	0.63	2.58	0.71	2.09	0.72	1.53	0.71
Express Idea	3.79	0.57	3.49	0.70	3.02	0.89	2.50	1.08	2.08	1.07
Lecture	1.49	0.96	1.87	0.87	2.57	0.94	3.27	0.91	3.81	0.63
Text & Rdgs	1.98	1.08	2.21	0.96	2.42	1.04	2.76	1.01	2.97	1.07
Discussion	1.65	1.04	2.16	1.05	2.81	1.09	3.42	1.00	3.83	0.74
Outside Asstce	2.87	1.80	3.47	1.64	3.90	1.39	4.06	1.21	4.27	0.99
Exam/Quiz	2.54	1.35	2.63	1.10	3.04	1.04	3.41	0.93	3.91	0.80
Labs/Field	4.43	1.31	4.39	1.27	4.38	1.22	4.62	0.96	4.47	1.05
Written Papers	3.30	1.73	3.46	1.53	3.75	1.34	4.15	1.10	4.08	1.00
Tchg Asst	4.55	1.15	4.42	1.22	4.26	1.27	4.26	1.22	4.47	0.97
Grading Pract	1.86	1.29	2.08	1.11	2.43	1.12	2.78	1.14	3.24	1.12
Course Eval	1.61	0.80	2.40	0.66	3.23	0.70	3.98	0.80	4.71	0.65

1. See Questionnaire -- Appendix A

Summary

Five factors were identified from the factor analysis of the Course and Instructor Evaluation Questionnaire. The constructs were labeled (1) overall evaluation/teaching style, (2) course structure, (3) support service, (4) self evaluation and (5) outside class activities. The five factors accounted for 58.51 percent of the total variance. The construct validity and the conservative estimate of the reliability of each item ranged from a high of 0.75 to a low of 0.39. The constructs agree with findings obtained from other studies of similar student's evaluation instruments of courses and instructors.

If the intent of the questionnaire were only to assess the course and instructor, the number of questionnaire items could be reduced to five; the number of constructs. Due to the fact that the questionnaire results are to be utilized by the individual instructors to assist them to improve their quality of instruction and modify the course content, the number of items should not be radically reduced.

Multivariate analyses of variance results were interpreted to be of importance when investigating the main effects of course level and instructor evaluation, but of little importance when investigating the main effects of college course offering, student's reported major college, student's class standing, student's cumulative grade point average, and student's reason for enrolling in a course. All main effect tests of significance were interpreted as significant, but investigation of the scale means suggest that only the results of the course level and instructor evaluation may be interpreted as meaningful.

The latter two analyses, course level and level instructor evaluation main effect, had scale means that ranged over more than one response category as the level of the independent variable increased from a lower level to a higher level e.g. the course level increased from 300 to 700 the student's cumulative grade point average scale means increased from category 2 to 4. Category 2 has a GPA of 2.00 to 2.49 and category 4 has a GPA of 3.00 to 3.49.

The dependent variables scale means increased or decreased across levels of the independent variables suggest linearity. As the course levels increase from

300 to 700 (1) the expected grade increases from "B" to "A", (2) the educational value increases from great value to extreme value, (3) clear coherent presentations increase from very clear to crystal clear, (4) examples increase from not enough to adequate, (5) stimulation of thinking increases from infrequently to fairly often, (6) expression of ideas increases from fairly often to consistently, (7) lectures increase from helpful to very helpful, (8) texts and readings increases from helpful to very helpful, (9) discussion increases from helpful to very helpful, (10) outside assistance increases from little help to very helpful, (11) exams/quizzes decreased from helpful to almost no help, (12) labs/field trips from almost no help to little help, (13) grading practices decreased from fair to somewhat fair, (14) course evaluation increased from above average to superior, (15) instructor evaluation increased from above average to superior and (16) grading practices decreased from fair to somewhat fair. It is interesting to note that student's attitude toward the helpfulness of exams/quizzes and fairness of grading practice become less positive as the course level increased.

The level of instructor's evaluation main effect was found to be significant, and 15 out of 17 dependent variables were interpreted as significant. Investigation of the scale means of the dependent variables suggest linearity across levels of the independent variable. As the instructors evaluation increased from poor to superior (1) the student's expected grade increased from "B" to "A", (2) the educational value of the course minor value to extreme value, (3) the level of instructor's clear and coherent presentation increased from difficult to crystal clear, (4) the instructor's number of examples increased, (5) the stimulation of thinking increased from stifles to fairly often, (6) the freedom to express ideas increased from infrequently to fairly often, (7) quality of lectures from little help to very helpful, (8) the helpfulness of texts and readings increased from helpful to very helpful, (9) the helpfulness of discussion increased from little help to very helpful, (10) the helpfulness of out-of-class aid increased from almost no help to helpful, (11) the helpfulness of exams and quizzes increased from little help to helpful, (12) the helpfulness of written papers increased from almost no help to little help, (13) the grading practices increased from somewhat fair to very fair, and (14) the course evaluation increased from below average to superior. The univariate F-tests results when investigating level of instructor evaluation using the dependent measures of cumulative GPA did rate instructors at different levels differently, but students expected grades differentiated between levels of instructor's evaluation.

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AN EXAMINATION OF RECENT TRENDS IN GRADE POINT AVERAGES AT THE FLORIDA STATE UNIVERSITY

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INTRODUCTION

This paper investigates several trends in the student grade point averages (GPA) at the Florida State University during the six years that the quarter calendar system has been in effect. The trends examined include the following: (1) the relatively rapid increase in the GPA during the past six-year period; (2) the increase in GPA in relation to an increase in the student's class level; (3) the significant increase in GPA during the three quarters of each separate academic year; and (4) the consistently higher GPAs achieved by female students than by male students. The causes and effects of these trends have been examined and projections concerning grade point averages have been formulated.

Suggestions for further study on Florida State grade point average data have been made, and some of these proposed studies will be conducted by Academic Research and Planning. All interested parties are encouraged to contact the author to discuss any points of view on this subject or to otherwise react to the contents of this paper.

SOURCES OF GRADE POINT AVERAGE DATA

Computation of grade point averages at FSU is based on the widely used formula which involves the assignment of quality point values to each earned grade. The quality point values are as follows: "A"-4; "B"-3; "C"-2; "D"-1; "F"-0. The GPA is computed by dividing the number of credit hours attempted at FSU into the total number of assigned quality points

At the end of each quarter the FSU Office of Records and Registration prepares a report containing GPA data for the various student levels (see Appendix A for a sample report). Since this document reports GPA statistics for each separate quarter, calculations on each report are not affected by past GPA statistics. The GPAs reported for the various student levels represent the statistics for the student's class level regardless of the level of the courses taken. For example, quality points earned by a freshman in a 300 level course would be counted only as freshman quality points and nowhere else.

The quarterly GPA reports do not include data from the College of Law. This is because the College of Law grades are not forwarded to the Office of Records and Registration until four to six weeks after the GPA report is completed. Consequently, Law GPAs are not reflected in this study.

It should also be noted that for the purposes of this study, the GPA data for undergraduates and graduates contain no quality points for quarter hours generated by "special students." While the special student data are combined with the undergraduate data in the registrar's GPA report, Academic Research and Planning has "backed out" these data. This was done because of the many changes in the definition of special students in recent years. GPA data for special students can be found in Appendix B of this study.

TRENDS IN THE GPA

Table I contains a history of the GPA for the six fall quarters which have been completed under the Quarter System at FSU. Several trends are observable from these data.

TABLE I

FALL QUARTER GRADE POINT AVERAGES AT THE FLORIDA STATE UNIVERSITY

Fall Quarter	Freshmen	Sophomores	Juniors	Seniors	Total Undergraduate	Total Graduate
1967	2.365	2.505	2.518	2.824	2.571	3.309
1968	2.382	2.565	2.532	2.823	2.590	3.373
1969	2.419	2.585	2.615	2.892	2.650	3.442
1970	2.419	2.581	2.741	2.966	2.698	3.446
1971	2.548	2.748	2.800	2.981	2.787	3.527
1972	2.578	2.760	2.827	3.031	2.820	3.547

Rapid Increase in GPA

The first of these trends involves the relatively rapid increase in the GPA for each separate student level from year to year. Table II provides further information on this trend. From 1967 to 1972 the total undergraduate GPA has increased 9.7% from 2.571 to 2.820. This increase,

however, has not been equally distributed to all undergraduate levels. The junior class GPA has set the fastest rate of increase with a 12.3% climb while the senior class GPA increased at a much lower rate of 7.3%. The graduate GPA increased at a rate of 7.2% over the entire six-year span and stood at 3.547 for the 1972 Fall Quarter.

TABLE II

THE PERCENT OF INCREASE IN GRADE POINT AVERAGES BY STUDENT LEVEL AT THE FLORIDA STATE UNIVERSITY

	Fall 1972 GPA	Fall 1967 GPA	Average Yearly Increase	Percent of Increase from 1967 to 1972
Seniors	3.031	2.824	.041	7.3%
Juniors	2.827	2.518	.062	12.3%
Sophomores	2.760	2.505	.051	10.2%
Freshmen	2.578	2.365	.043	9.0%
Total Undergraduate	2.820	2.571	.050	9.7%
Total Graduate	3.547	3.309	.048	7.2%

As reported in Table II the undergraduate Fall Quarter total GPA has increased at a yearly average of 0.050 over the past six-year period. If this average yearly increase continues, it is projected in Table III that the average undergraduate GPA will exceed 3.0 by the Fall Quarter of the 1976-77 academic year.

TABLE III

GPA PROJECTIONS FOR THE FLORIDA STATE UNIVERSITY

Fall Quarter of Academic Year	Projected GPA Undergraduate	Graduate
1973-74	2.870	3.595
1974-75	2.920	3.643
1975-76	2.970	3.691
1976-77	3.020	3.739

In other words, the average undergraduate student at Florida State will be carrying a solid "B" average within four years. These projections assume a continued increase in the GPA and no changes in university admissions or grading policies. Table III also shows a projection of the graduate GPA based on its six-year average rate of increase of 0.048. In 1976-77, the year the undergraduate average GPA is projected to exceed 3.0, the graduate average GPA will be in excess of 3.7. It is probable, of course, that as the graduate GPA approaches the maximum of 4.0 the rate of increase will be slowed by a ceiling effect A tongue-in-cheek prediction, however, based on a straight-line projection shows that by the Fall Quarter of the 1982-83 academic year, the FSU graduate GPA will exceed 4.0.

While it is difficult to hypothesize on the cause of the rapid increase in the undergraduate and graduate GPA, such hypotheses must necessarily be formulated and investigated. One would like to think that the primary reason for the afforementioned increases is that Florida State has been recruiting an increasingly superior caliber of student. While this assumption is probably true in part, the University would be doing itself a great disservice not to recognize and investigate other reasons for the increase.

Discussions with Florida State admissions officials failed to uncover any change in the admission policies for the past six years which would produce a significantly higher caliber of incoming students. In fact, for freshmen students the minimum Florida Twelfth Grade Test score requirement was lowered from a total of 350 to 300 effective Fall, 1971. A preliminary investigation of the Florida Twelfth Grade Test score for incoming freshmen at the Florida State University has revealed that the mean score is actually decreasing. Further investigation in this area based on better data sources is required before this decrease can be firmly documented.

It has been theorized that because of better high school and undergraduate schooling the incoming undergraduate and graduate students are of a generally higher caliber. However, this author believes that any increase in student ability caused by previous schooling is not great enough to be responsible for a significant portion of the yearly increase in GPA. It is hypothesized that most of the GPA increase has been caused by changes in FSU formal and informal policies concerning grading.

One of the university policy changes which may have had an effect on the GPA is the liberalized policy concerning satisfactory-unsatisfactory grades. Prior to Fall, 1967, satisfactory-unsatisfactory (S-U) grades were only awarded "in individual study, thesis, dissertations, recital, and internship credit..."[1] No S-U grades were allowed at any level, outside of these particular course types. Since the Fall Quarter, 1967, Florida State's policy on S-U grades has permitted a limited enrollment on an S-U basis by both undergraduate and graduate students in elected courses outside of their major and minor fields.[2]

Claunch[3] reports statistical support for the assumption that the student will generally use the alternative (S-U) grading option for those courses in which he anticipates receiving a lower grade. One can readily see that the prospective action of the S-U grade can become a direct cause in increasing the general GPA since the S-U option will eliminate the negative effect of the potentially lower grade which may have been earned and averaged in the GPA if not for the S-U option. Indeed, Claunch reports that the S-U systems tends to result in "a general rise in quality point averages due to the exclusion of some of the lower grades."[4]

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[1] The Florida State University Graduate Bulletin, 1967-68, p. 33.

[2] An undergraduate must be at least a second quarter freshman and have at least a 2.5 GPA. No minimum GPA is required for a graduate student, but other restrictions are imposed. In both cases, proper forms must be completed signed and returned to the FSU Office of Records and Registration. See the 1972-73 edition of the Florida State University Catalog for additional details on S-U requirements. Refer to p. 32 for undergraduate student policies and to p. 46 for graduate student policies.

[3] Sidney J. Claunch, "The Effects of Pass-Fail Grading on Quality Point Averages," College and University, XLVII (Winter, 1972), p. 94.

[4] Ibid., p. 101.

The use of the S-U option at Florida State has been the subject of some investigation. A 1971 dissertation by an FSU doctoral candidate[1] reports that in academic year 1969-70, 1049 undergraduate students used the S-U option at FSU. Of these 1049, the male-female split was approximately fifty-fifty. The study concluded that based on both interviews and questionnaires "most students used the S-U option in order not to worry about a grade or to protect their GPA."[2]

The number of FSU students utilizing the S-U option has been steadily increasing. The exact numbers of students can only be determined by examining microfilm records in the Office of Records and Registration. These records are available from Spring Quarter 1969 to the current quarter. An examination of these would be a tedious task indeed, but staff members in the Office of Records and Registration estimated that approximately 1500 to 1600 students applied for the S-U option during the fall quarter of 1972.

Further studies are necessary before one can definitely say that the S-U option at FSU has affected the GPA in a significant manner. Such a study could be structured several ways. Further study focusing on the S-U option's effect on the individual GPAs would prove more useful than a study of the effect of the S-U option on a total class GPA.

A second university policy change possibly affecting the GPA is the "forgiveness policy" which was implemented during Winter Quarter 1971 for undergraduate students only. This policy stipulates that if an undergraduate student received a "D" or "F" the student may repeat the course and "only the grade and credit received in the final attempt shall be used in computing the overall grade point average..."[3] It is estimated by the Office of Records and Registration that approximately two thousand students utilized the provisions of the forgiveness policy during the 1972 Fall Quarter. There is no forgiveness policy in effect for graduate students.[4]

Without further study it is not possible to state the exact effect of the forgiveness policy on the undergraduate GPA. The policy has been in effect for only

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[1]R. O. Nations, "An Evaluation of the Undergraduate Satisfactory-Unsatisfactory Grading Option at the Florida State University." (unpublished Ph.D. dissertation, The Florida State University, 1971).

[2]Ibid., p. 125.

[3]The Florida State University Catalog, 1972-73, p.32.

[4]Ibid., p. 46.

two years, and during this period the undergraduate GPA has increased but not at a rate superior to the increase occurring in quarters prior to the advent of the forgiveness policy. One could reasonably theorize, however, that the policy has attributed to the upward trend in the undergraduate GPA, but more study is needed to determine the power and nature of this potential effect.

In addition, other administrative policies affecting the GPA vary from school to school. These policies include use of the "incomplete grade" (I) to give the student more time to complete course requirements, and the use of the "WD" and "W" grades which denote that a student has withdrawn from a course with permission.[1] In both cases the policies governing the users of these grading options are very flexible, and their interpretation vary from school to school and even within some schools.

Another factor affecting the GPA is the increase in the use of "performance-based" or "contract-based" courses at FSU. In these courses a student exercises a much greater control over his final grade and is not in direct competition with his peers for the limited number of higher grades which would be awarded in a traditionally managed class. Since the advent of performance based classes is recent, and because their number is unfortunately small by comparison, the effect of these courses on the total GPA may still be slight at this point in time.

The final factor to be discussed is perhaps one of the most difficult to measure. This factor is whether or not the Florida State University academic administration and faculty attitudes toward grading have become more liberal in the past six years. It is a widely accepted truism that most grades awarded to graduate students will be "A" and "B" and that receiving a "C" is tantamout to failing a graduate course.[2] This has been an informal policy and its effects vary among schools. It has, however, accounted for the graduate GPA traditionally being in excess of 3.0 at FSU as well as at most other national universities.

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[1]See page 31 of the 1972-73 edition of the Florida State University Catalog for an explanation of "grading Practices."

[2]In the Fall Quarter of 1972, 95.4% of all "regular" graduate grades (A,B,C,D,or F) were either an "A" or "B" grade. S-U grades were not included in this calculation.

If faculty attitudes towards awarding undergraduate students "A" and "B" grades have become more liberal, this change could account for part of the undergraduate GPA increase. One of the difficulties in studying this potential factor is that no base line data on past FSU faculty attitudes towards grading exist. Such data would be most helpful in a comparative study, and it is hoped that a research design to study this factor will be formulated and implemented.

Higher GPA at Higher Student Levels

A second trend apparent from the data in Table I (repeated below) is that the higher the student level, the higher the GPA.

TABLE I (repeated)

FALL QUARTER GRADE POINT AVERAGES AT THE FLORIDA STATE UNIVERSITY

Fall Quarter	Freshmen	Sophomores	Juniors	Seniors	Total Undergraduate	Total Graduate
1967	2.365	2.505	2.518	2.824	2.571	3.309
1968	2.382	2.565	2.532	2.823	2.590	3.373
1969	2.419	2.585	2.615	2.892	2.650	3.442
1970	2.419	2.581	2.741	2.966	2.698	3.446
1971	2.548	2.748	2.800	2.981	2.787	3.527
1971	2.578	2.760	2.827	2.031	2.820	3.547

Table I shows that the difference between the Fall 1972 senior and freshmen GPAs was nearly one-half a grade point. Furthermore, this difference has been fairly constant over the past six years reported in Table I.

There are several possible reasons for this trend, and most have little to do with university administrative policy changes. It is hypothesized that this trend is a result of an interaction effect of several "personal forces" acting upon the individual students.

The first of these interacting effects which have resulted in the higher GPAs being achieved by the higher student classes appears to be that many students who have

enjoyed academic success will have dropped out after their freshman year or during their sophomore year. The total freshmen and, to a lesser extent, the total sophomore GPAs will have been lowered by the inclusion of the GPAs of these unsuccessful students. After these students leave, the absence of this negative influence on the junior and senior GPAs helps to produce higher GPAs for these two classes.

Also attributing to the higher grade point averages being achieved by the higher student classes is the effect of what will be referred to here as the "acclimation factor." This refers to the process of adapting to the new environment confronted by a student during his first few quarters at FSU. This acclimation process includes the making of friends, the development of study habits, overcoming the anxieties of the early weeks of classes, discovering solutions to the problems caused by living away from home for the first time and simply learning where places and services are in this complex mini-city called the Florida State University. Coombs and Davis[1] point out in a study of the socio-psychological adjustment of college students that the student who learns how to conform to the "system" will perform better scholastically. Coombs and Davis state that learning this skill of conforming takes time, and that in many instances the newer students (freshmen and sophomores) are less willing to make this adjustment. The acclimatization of students will be discussed again in this paper in relation to another GPA trend.

It is also hypothesized that the fact that juniors and seniors are taking the majority of their courses in their major or minor directly related to the higher GPAs at these student levels. Most freshmen and sophomores are mainly enrolled in courses designed to fulfill the basic studies requirements. It is postulated that students enrolled in courses relating to their major will be more successful sholastically for the following reasons: (1) the student interest and motivation will be greater; (2) the student may be more familiar with the material; (3) the student may be more familiar with the professor's methods and expectations; (4) the student may be in a less apprehensive atmosphere because of the presence of friends and acquaintances in the class; (5) the classes

[1]Robert H. Coombs and Vernon Davis, "Socio-Psychological Adjustment in Collegiate Scholastic Success," Journal of Educational Research, LXI (December, 1967) pp.130-136.

are generally smaller; and (6) the material may seem more relevant to the student's future career. These positive factors also apply to most graduate students as well as to juniors and seniors.

A final factor is hypothesized as having a positive effect on the average senior GPA and, to a lesser extent, the average Junior GPA. This factor is the desire which develops among seniors and juniors to enroll in a graduate school after completing their undergraduate studies. This desire can cause the student to place increased emphasis upon improving his GPA since the undergraduate GPA is currently a very important criteria for admission to graduate schools.

As mentioned earlier, these factors affecting this second GPA trend will vary in strength from student to student, thus making it more difficult to determine their exact effect on the GPA. However, the fact that they are more individual in nature does not make them impossible to measure. Therefore it is suggested that the power of these aforementioned effects be further studied.

Increase in GPA During Academic Year

A third trend observed in the FSU grade point average data is the increase in the GPA during the three quarters of each separate academic year. As seen in Table IV the GPA improves from the fall quarter to the spring quarter of each academic year. With the coming of the next academic year the GPA for the fall quarter then drops below what it was during the previous spring quarter. This trend occurs without exception for the undergraduate data reported in Table IV. In the graduate GPA data there is one time during the 1971-72 academic year where the GPA dropped during the academic year, but the decrease was very minor, and the 1971-72 graduate GPAs still experienced a small increase over that entire academic year.

The differences between the fall quarter GPA and the spring quarter GPA for each academic year are shown in column 5 of Table IV. Note that the difference (spring minus fall) has been steadily creasing for the undergraduate level since 1968-69. For the graduate level this difference has established no firm pattern.

TABLE IV

GPA DATA FOR THE FLORIDA STATE UNIVERSITY SHOWING THE INCREASE OCCURRING DURING EACH ACADEMIC YEAR

Academic Year (1)	Fall Quarter (2)	Winter Quarter (3)	Spring Quarter (4)	Spring Qtr minus Fall Qtr (5)
1967-68				
Undergraduate	2.571	2.626	2.667	.096
Graduate	3.309	3.390	3.405	.096
1968-69				
Undergraduate	2.590	2.669	2.753	.163
Graduate	3.373	3.443	3.486	.113
1969-70				
Undergraduate	2.650	2.741	2.795	.145
Graduate	3.442	3.474	3.483	.041
1970-71				
Undergraduate	2.698	2.812	2.819	.121
Graduate	3.446	3.509	3.536	.090
1971-72				
Undergraduate	2.787	2.868	2.886	.099
Graduate	3.527	3.517	3.549	.022

It is hypothesized that the GPA increase during each academic year is caused by a combination of several factors, some of which were discussed earlier in this paper as also affecting other trends. One of these factors involves the drop-out -- the student who has not enjoyed academic success and who either by choice or at the university's insistence leaves during the academic year. The majority of these students will be carrying a below-average GPA, and after they depart the absence of this negative effect would cause the general GPA to increase. This increase would especially be felt in the spring quarter and to a lesser extent in the winter quarter.

Another reason for the GPA increase during an academic year is the effect of the "acclimatization factor." The reader will recall that this factor was previously defined as the process of adapting to a new environment confronted by a student in the beginning of the academic year. It is believed that as the academic year progresses the newer student will begin to have fewer anxieties about his new surrounding and that this attitude will be reflected in improved scholastic success.

With the exception of the junior college transfer student, both the drop-out factor and the acclimation factor would have a much lesser effect on the junior and senior grade point averages. A study should be conducted to determine if the freshman and sophomore GPAs increase at a faster than average rate during the academic year, and if this rate of increase is a primary factor for the total undergraduate rate of increase during that time period.

Higher Average Female GPA

The final grade point average trend to be discussed in this paper involves the GPA data for male and female students as displayed in Table V. For every grade level the female GPA exceeds the male GPA. This fact is not unique to the Florida State University or even to college-level students. It is a well established fact that at all levels of schooling the female students, on the average, receive higher grades than do the male students. It is interesting to note that the difference between the FSU male and female GPAs at the graduate level is much lower than the difference for any undergraduate level. This may be due in part to the more limited range of grades normally issued in graduate level courses.

TABLE V

FALL 1972 MALE AND FEMALE GPA AT THE FLORIDA STATE UNIVERSITY

	Male (1)	Female (2)	Difference (2-1)
Freshman	2.452	2.679	0.227
Sophomore	2.623	2.866	0.243
Junior	2.660	3.007	0.347
Senior	2.886	3.188	0.302
Total Undergraduate	2.680	2.935	0.255
Total Graduate	3.518	3.593	0.075

In view of the current national controversy concerning male and female abilities, status, and social roles, this trend assumes a greater degree of interest. To hypothesize on this trend may add fuel to a fire that is perhaps already burning too brightly for some. Nevertheless, it is apparent from the data in Table V that the female students at FSU are more successful than the male students when the success factor is measured by grades received.

Several hypotheses can be formulated concerning the reasons for the higher female GPAs. The hypothesis that the female students at Florida State are intellectually superior to the male students is not supported by average Florida Twelfth Grade Test scores for FSU male and female students. These data show that the male average Florida Twelfth Grade Test score is 402.05 while the female average score is slightly lower at 397.08.[1]

It is interesting to note that this phenomenon involving a lack of correlation between standard test scores and student GPAs has been noted in other literature. In a study of predictive abilities of the SAT scores for undergraduate students Siegleman found

[1]These averages were obtained from Fall 1972 data and only include the 5421 undergraduate students for whom Florida Twelfth Grade Test scores had been recorded on the Enrollment Data Base. The averages include 3152 female students and 2269 male students.

"exceptionally low correlations between SAT scores and grades for males in contrast to females."[1] Siegleman noted that a high SAT score for a male does not necessarily mean the male will be academically successful in undergraduate studies, but that a high SAT score for a female is a valid basis for predicting academic success in undergraduate work. In another study Payne[2] came to approximately the same conclusions involving Graduate Record Exam scores in relation to male and female graduate student GPAs.

A more plausible hypothesis is that the female students apply themselves to the task of studying and completing course requirements in a manner superior to male students. It is also possible that the female students are more grade conscious than male students.

Another hypothesis is that the majority of the female students at Florida State are enrolled in disciplines where higher grades are traditionally more common. This factor would only affect the junior and senior GPA since students must complete a somewhat common basic studies program regardless of sex and future major. The fact, however, that the sex differences between the male and female junior and senior GPAs are greater than the sex differences between the male and female freshman and the sophomore GPAs does lend some credibility to this theory. Therefore a study of male and female GPA by discipline[3] is suggested.

Historically, the FSU undergraduate male GPA has been increasing at a slightly higher rate (9.9% increase) than the female GPA (8.2% increase). Investigation of the graduate GPA for the same six-year period revealed the rate of increases nearly equal for both male and female graduate students.

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[1]Marvin Siegelman, "SAT and High School Average Predictions of Four-Year College Achievement," Educational and Psychological Measurement, XXXI (Winter, 1971), p. 948.

[2]David A. Payne, "Another Contribution to Estimating Success in Graduate School: A Search for Sex Difference and Comparison Between Three Degree Types," Educational and Psychological Measurement, XXXI, (Summer, 1971) pp.497-503

[3]These disciplines should be structured in accordance with SICHE/HEGIS Taxonomy of Instructional Programs in Higher Education (Office of Education publication #OE-50064, 1970 ed.)

CONCLUSIONS

Of the four trends discussed perhaps the one deserving the most immediate further study and consideration is the first trend, that which involves the overall increase in GPA (as shown in Table I). The reader will recall that it was hypothesized that this trend was directly affected by changes in the university's formal and informal grading policies. These changes included the liberalization of the S-U policy, the use of the forgiveness policy, and the changes in attitude towards grades in general by both academic administrators and the general faculty at FSU.

In view of this increase in the overall GPA one must question the validity of the GPA as a measurement of the quality of fitness of a student. Internal uses of the GPA such as establishing standards for qualifying for deans lists and degrees of distinction should be reviewed and changed as necessary.[1] If this GPA trend is nationwide, as some administrators suggest, perhaps graduate schools should place even less reliance on the GPA as a measure of student ability and undergraduate success.[2]

It has been the purpose of this paper to bring GPA trends at FSU into focus for the university community. Further study into these trends is planned, including studies concerning the strength of these trends within individual schools and colleges at the Florida State University. Therefore, the Office of Academic Research and Planning encourages all interested parties to react to this paper and its numerous suggestions for further study.

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[1]With respect to the effect of the GPA increase on the number of students qualifying for the Dean's List in the schools of FSU, the following statistics are presented: In the College of Arts and Sciences the number of students on the Dean's List in Fall 1968 was 321 and by Fall 1972 this number increased to 622; in College of Education for the same time period the number increased from 267 to 515 students (this rise would have been even larger had not a policy change removed all student teachers from qualifying for the Dean's List) In both schools one needs a 3.5 GPA to qualify for the Dean's List.

[2]In view of the projected increase in the FSU undergraduate GPA, it is interesting to note that at FSU a student can be admitted into graduate study as long as he can present evidence that he had a grade point average of at least 3.0 for the last two years of study for the baccalaureate degree. If the student has achieved this 3.0 GPA he does not need to attain the minimum score of 1000 on the combined verbal and quantitative portions of the aptitude test of the Graduate Record Examinations to be admitted into graduate study at FSU.

APPENDIX A

THE FLORIDA STATE UNIVERSITY
Office of the Registrar
FALL QUARTER AVERAGES 1972
January 17, 1973

	SUDENTS	QUARTER HOURS	QUALITY POINTS	AVERAGES
ALL STUDENTS EXCEPT LAW (0-9)	18,619	217,131.00	631,527.00	2.909
Men	9,699	109,545.00	307,431.00	2.806
Women	8,920	107,586.00	324,096.00	3.012
FRESHMEN	2,586	34,303.00	88,440.00	2.578
Men	1,144	15,265.00	37,428.00	2.452
Women	1,442	19,038.00	51,012.00	2.679
SOPHOMORES	2,821	38,908.00	107,385.00	2.760
Men	1,235	16,973.00	44,524.00	2.623
Women	1,586	21,935.00	62,861.00	2.866
JUNIORS	4,959	66,060.00	186,768.00	2.827
Men	2,625	34,170.00	90,880.00	2.660
Women	2,334	31,890.00	95,888.00	3.007
SENIORS	3,891	47,981.00	145,426.00	3.031
Men	2,016	24,950.00	72,014.00	2.886
Women	1,875	23,031.00	73,412.00	3.188
SPECIALS (0,6,7,8,9)	832	4,851.00	14,740.00	3.039
Men	428	2,639.00	7,881.00	2.986
Women	404	2,212.00	6,859.00	3.101
UPPER CLASS (2,3,4)	11,671	152,949.00	439,579.00	2.874
Men	5,876	76,093.00	207,418.00	2.726
Women	5,795	76,856.00	232,161.00	3.021
GRADUATES	3,530	25,028.00	88,768.00	3.547
Men	2,251	15,548.00	54,704.00	3.518
Women	1,279	9,480.00	34,064.00	3.593
UNDERGRADUATES	15,089	192,103.00	542,759.00	2.825
Men	7,448	93,997.00	252,727.00	2.689
Women	7,641	98,106.00	290,032.00	2.956

APPENDIX B

GRADE POINT AVERAGE DATA FOR SPECIAL STUDENTS AT THE FLORIDA STATE UNIVERSITY

	No.	GPA
Fall, 1967	240	2.723
Fall, 1968	248	2.941
Fall, 1969	235	3.043
Fall, 1970	324	3.034
Fall, 1971	584	3.073
Fall, 1972	832	3.039

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1. The Florida State University Catalog, 1967-68.

2. The Florida State University Catalog, 1972-73.

3. The Florida State University Graduate Bulletin, 1967-68.

4. "Grade Distribution Report," by the Office of Records and Registration, Fall 1972.

5. Quarterly reports of grade point averages by the Office of Records and Registration, Fall 1967-Fall 1972.

CLEP IN THE STATE UNIVERSITIES

By

Daniel Coleman

CLEP IN THE STATE UNIVERSITIES

The merits of utilizing the College-Level Examination Program (CLEP) as a means of assessing educational competencies and awarding college credit have been questioned by members of the academic community since CLEP's inception. Although CLEP was conceived to serve the nontraditional student who had acquired knowledge through other than traditional college courses, it is currently being used by many institutions as a vehicle for granting college credit to students who move directly from secondary school to college. In an attempt to determine the merits of awarding college credit by CLEP and to determine the effects of CLEP on student development, the Florida public institutions of higher education have undertaken a comprehensive three-year study.

It was the purpose of this investigation:

(1) to assess the degree of consistency among the CLEP policies of the nine SUS institutions

(2) to gather information which would facilitate the development of an FTU CLEP policy.

The College-Level Examination Program was established by the College Board in 1965 (CLEP Fact Sheet). It was developed with a broad purpose of establishing a national system of awarding credit by examination. The program consists of two basic types of examinations. The five General Examinations were designed to provide a comprehensive measure of the liberal arts areas, and the Subject Matter Examinations were designed to assess achievement in specific courses. Although the program was designed for the nontraditional student, the program has been expanded in many different directions and is being utilized in a variety of ways. They are as follows:

(1) to enable unaffiliated students to demonstrate their knowledge and validate their learning by receiving college credit on the basis of examinations.

(2) to provide measures of college equivalency for use by business, industry, and other noncollegiate organizations.

(3) to help meet licensing and certification requirements and to provide a means of qualifying for job advancement.

(4) to assist colleges in the placement of students.

(5) to award college credit.

The CLEP Amendment to the Articulation Agreement of 1972 provided the impetus at FTU for developing a comprehensive CLEP policy that was both fair to the student and intellectually honest. Accordingly, since the results of the comprehensive three-year CLEP study should contribute to the development of a meaningful policy, it was essential that the new policy was both consistant with other institutional policies and required the student to be accountable for the accumulation of knowledge that was assessed by CLEP examinations. With these factors in mind, an investigation was undertaken to analyze the CLEP policies of SUS institutions and develop an FTU CLEP policy.

Procedure

During Fall Quarter, 1972 a telephone interview was conducted with the appropriate university personnel to determine the answers to the following items:

(1) Did the institution have a new CLEP policy?

(2) What was the minimum acceptable percentile score as determined by the National Sophomore norms?

(3) What examinations were being offered for credit?

(4) How many credit hours were being awarded for each General Examination?

(5) What procedure was used to determine the appropriate number of credit hours to be awarded for the Subject Examination?

(6) Did they look behind the A.A. when it was conferred by a public junior college?

(7) Was CLEP Subject Matter Examination credit applied toward the upper division requirements?

TABLE A

A SUMMARY OF COLLEGE LEVEL EXAMINATION PROGRAM POLICIES
FOR EACH UNIVERSITY OF THE STATE UNIVERSITY SYSTEM

UNIVERSITY	NEW POLICY	MINIMAL ACCEPTABLE PERCENTILE	EXAMINATION		CREDIT HOURS		ANALYZE JC CLEP CREDITS	APPLY CLEP SUBJECT EXAMINATION CREDIT TOWARD UPPER DIV.
			GEN.	SUBJ.	GEN.	SUBJ.		
F.A.M.U.	In Progress	50th	X	X	Under Consid-eration	Under Consid-eration	Under Consider-ation	Yes. Select Subject Matter Examinations
F.A.U.	No. Under Study	25th-Fall 72 50th-Fall 73	X		9 Qtr. Hrs.	No	No	No
F.I.U.	Yes	25th	X	X	9 Qtr. Hrs.	Maximum ACE rec-ommended	No	No
F.S.U.	Yes	50th or above	X	X	3-6 Qtr Hrs.	3-9 Qtr. Hrs.	No. Not for AA & AS	Yes. Upper Division Liberal Studies
F.T.U.	Yes	50th	X	X	6 Qtr. Hrs.	*	Yes	Yes. Select Subject Matter Examinations
U.F.	Yes	50th	X	X	9 Qtr. Hrs.	Decision of Indv. College	Yes	No
U.N.F.	Yes	25th	X	X	9 Qtr. Hrs.	Maximum ACE rec-ommended	No	No
U.S.F.	Yes. Focus Under Study	50th	X	Under Study	9 Qtr. Hrs.	Course Content	Yes	No
U.W.F.	Yes	50th	X	X	9 Qtr. Hrs.	Maximum ACE rec-ommended	No	No

*Course hours with ACE recommendations as absolute maximum

Source: These data were obtained by telephone interview during the Fall of 1972 and updated during June of 1973.

Office of Institutional Research
June, 1973
bw

Based on the results of this investigation and the principle that a student should be allowed to receive credit by examination provided that he has not received comparable college credit in the CLEP examination area or have received credit in a more advanced course in which the accumulation of knowledge or skills were essential, the FTU CLEP policy was developed. During June, 1973 each SUS institution was contacted to determine if their CLEP policy had been amended since Fall Quarter, 1972.

FINDING

Survey Finding

The investigation revealed that a majority of the institutions had either devleoped a new policy or were in the process of developing a policy. Table A provides a brief summary of the findings as of June, 1973. Six of the Universities awarded credit at the 50th percentile or above (National Sophomore Norms, National Sophomore C Norms for subject examinations). The three institutions that awarded credit at the 25th percentile were junior-senior institutions and used the CLEP credit primarily to make up lower level deficiencies.

The use of the General Examinations was more common than was the use of the Subject Matter Examinations. The General Examinations were used by each institution. The number of credits ranged from 3 to 6 quarter-hours at Florida State University to 9 quarter hours at a majority of the institutions. FTU was the only institution that granted 6 quarter hours for each General Examination. It is important to note that the Universities which offer only junior and senior undergraduate programs utilize the CLEP General Examinations primarily to make up lower level deficiencies. The Subject Matter Examinations were used by a majority of the institutions. The number of quarter hours varied from 3 to 9 with the absolute maximum being the American Council on Education recommendations.

The practice of looking behind an Associate of Arts Degree which was conferred by a public junior college or applying CLEP credit toward meeting the upper division requirements is quite uncommon. Three institutions -- FTU, UF, and USF -- will not honor credit which has been awarded at less than the 50th percentile (National Sophomore

Norms). Accordingly, FTU will not accept both CLEP credit credit and course credit when there is an obvious duplication. Only three institutions will allow a student to apply CLEP Subject Matter Examination credit toward the upper division requirements. In each incident the institutions have specific conditions that must be taken into consideration.

FTU Policy

The Florida Technological University policy has three basic elements -- general guidelines, General Examination guideline, and Subject Matter Examination guideline. This policy is presented in its entirity in the following section. The general guidelines provide general conditions concerning the awarding or honoring of CLEP credit for both native and transfer students. Table B and Table C provide definitive guidelines concerning the examination area as well as courses and other examinations for which duplicate credit will not be awarded or recognized. Accordingly, every effort was made to eliminate duplicate credit among the CLEP examination and University courses which are covered by the examination area. Once a student has completed a course in the CLEP examination area or completed a more advanced course in which the accumulation of knowledge or skills in the examination area are essential, the student is not allowed to take the CLEP examination for credit. Accordingly a student who has received credit for a CLEP examination is not allowed to receive credit for the course or other courses in the examination area even though he did not select those courses for his individual program. For example, a student would not be allowed to take Chemistry 101 or Physics 100 for credit as the Natural Science CLEP General Examination is supposed to cover all of the areas.

Summary

The investigation revealed that the institutions of the State University System have policies which are quite similar. The data in Table B was most valuable in the development of the Florida Technological University policy. Although the Florida Technological University policy does not indicate courses which are equivalent to the CLEP examination, it does provide courses which parallel

the examination area and lists courses for which duplicate credit will not be awarded. Thus, the student and his adviser have the flexibility of selecting the specific courses they wish to include in the individual's program of study.

FLORIDA TECHNOLOGICAL UNIVERSITY CLEP POLICY

FTU will honor up to 67½ quarter hours (45 semester hours) of credit for the successful completion of CLEP General Examinations and CLEP Subject Matter Examinations. Successful completion of any examination means performance at or above the 50th percentile (national sophomore CLEP norms). Awarding or honoring CLEP credit is subject to the following conditions:

1. Undergraduate students may be awarded CLEP credit provided they have not received comparable college credit in the CLEP examination area or have not completed a more advanced course in which the accumulation of knowledge or skills in the examination area is essential.

2. CLEP credit can not be used to reduce a grade point deficiency, i.e., a CLEP grade (satisfactory) can not be substituted for the grade awarded in a previously completed course.

In addition to conditions 1 and 2, guidelines for awarding or honoring CLEP credit to transferees and FTU students are listed below. Table I and Table II provide FTU guidelines for awarding CLEP credit. These tables also provide a list of the FTU courses and other CLEP examinations for which duplicate credit will not be awarded or honored.

A. Florida Technological University Students:

Florida Technological University students who participate in the CLEP program will be awarded credit in accordance with the FTU CLEP guidelines (see Table I and Table II).

B. College Transferees:

Students transferring to Florida Technological University will be granted CLEP credit in accordance with the number of credits awarded by the institution from which they are transferring provided the CLEP credit was awarded at the 50th percentile and the number of credit hours does not exceed the recommended maximum as delineated in the Articulation Agreement.

CLEP examinations may be taken at a number of testing centers throughout Florida and the nation. Information on the CLEP tests, the location of test centers, examination costs, and the procedure for test registration may be secured by writing to:

Educational Testing Service
College Level Examination Programs
P. O. Box 592
Princeton, New Jersey 08540

AA:2/73

TABLE B

Guidelines for Awarding College Credit for CLEP General Examinations
and Courses and Examinations for Which Duplicate Credit Can Not Be Awarded

CLEP General Examinations	Quarter* Credits	Percentile Sophomore Norms	Scaled Score	Courses and Examinations for which duplicate credit will not be awarded or recognized	
				FTU Courses	Other CLEP Exams
English Composition	6	50	494	ENG 100: Vocabulary Study ENG 101: Composition I	Subject: English Composition
Humanities	6	50	489	Introduction to Art** Introduction to Literature** HUM 201: W. Humanities Survey MUS 199: Enjoyment of Music	
Mathematics	6	50	497	Intro. Math & Remedial Math MATH 100: Principles of Math MATH 101: Elem School Math I MATH 104: Fundamental Algebra MATH 115: Finite Mathematics	—
Natural Science	6	50	489	BIOL 103: Biological Principles ENGR 100: Oceanography & Space CHEM 101: Chemistry & Society PHYS 100: Physical Science	Subject: Biology Subject: Chemistry
Social Science - History	6	50	488	HIST 201: West. Cult. & Civ. I SOC 201: General Sociology	Subject: Western Civilization Subject: Intro. to Sociology

* The total number of CLEP credits awarded can not exceed the maximum number of hours as determined in the Articulation Agreement.

** Not offered at Florida Technological University

AA:2/73

TABLE C

Guidelines for Awarding College Credit for CLEP Subject Examinations
and Courses and Examinations for Which Duplicate Credit Can Not be Awarded

CLEP Subject Examinations	Quarter* Credits	Percentile Sophomore C Norms	Standard Score	Courses and Examinations for which duplicate credit will not be awarded or recognized	
				FTU Courses	Other CLEP Exams
American Government	4	50	47	PCL 201	
American History	8	50	50	HIST 311 & HIST 312	
American Literature	6	50		ENG 311 & ENG 312	
Analysis & Interp. Lit.	4	50	49	ENG 210	
Biology	8	50	49	BIO 100 or 103 & ZOO 100	General: Natural Science
College Algebra	4	50	50	MATH 106 & MATH 110	
College Algebra & Trig.	4	50	49	MATH 106 or MATH 110 & MATH 111	Subject: Trig.
Computer & Data Processing	4	50	46	COMP 101	
Elem. Comp. Prog.-FortranIV	4	50		COMP 102	Subject: Comp.&Data Proc
Edu. Psychology	4	50	47	No Parallel Course	Subject: Hum.Grwth.&Dvlp
Eng. Comp.	6	50	45	ENG 101 & ENG 103	General: English Comp.
English Literature	6	50	45	ENG 211 & ENG 212	
General Chemistry	6	50	48	CHEM 111 or CHEM 261 & CHEM 262 ENGR 151 & ENGR 152	General: Natural Science
General Psychology	4	50	47	PSY 201	
Geology	8	50	49	GEOL 100 & GEOL 201	
History of American Edu.	4	50	46	No Parallel Course	
Human Growth & Development	4	50	47	EDTA 206	
Introductory Accounting	8	50	50	ACCY 111 & ACCY 112 or ACCY 307	
Introductory Business Law	4	50	51	BADM 371	
Introductory Business Mgmt.	4	50	47	No Parallel Course	
Introductory Calculus	8	50	48	MATH 321 & MATH 322 or MATH 320	
Introductory Economics	8	50	48	ECON 201 & ECON 202	General: Soc. Sci.-Hist.
Introductory Marketing	4	50	48	MKTG 301	
Introductory Sociology	6	50	46	SOC 201 & SOC 202	General: Soc. Sci.-Hist.
Money & Banking	4	50	48	FIN 331	
Statistics	4	50	49	STAT 201 & STAT 301	
Tests & Measurement	4	50	46	EDTA 305	
Trigonometry	4	50	49	MATH 111	Subject: Col. Alg.&Trig.
Western Civilization	8	50	50	HIST 201 & HIST 202	General: Soc. Sci.-Hist.

* The total number of CLEP credits awarded can not exceed the maximum number of hours as determined in the Articulation Agreement.

Note: Other subject matter examinations will be incorporated as they are developed.

SOME IMPLICATIONS FOR INSTITUTIONAL RESEARCH AND PLANNING OF INTER-INSTITUTIONAL COURSE REGISTRATION ARTICULATION AGREEMENTS

By

T. Wayne Keene

SOME IMPLICATIONS FOR INSTITUTIONAL RESEARCH AND PLANNING OF INTER-INSTITUTIONAL COURSE REGISTRATION ARTICULATION AGREEMENTS

T. Wayne Keene

University of South Florida

This paper poses some questions or issues which will need the attention of institutional researchers if the concept of cross-registration in courses among institutions is developed. It is intended to be a thought-provoking presentation rather than the more common report of a completed study. The term "cross-registration" as used here is defined as registration for courses at more than one institution concurrently and/or alternating registration among more than one institution from term to term, all without separate or repeated admissions or transfer procedures being required by the various institutions involved.

BACKGROUND

Increased concern about resource utilization and allocation efficiency in higher education is a fact of life today. The concern has been well demonstrated by legislatures, governing boards and questioning citizens in general. Such actions as legislative statutes specifying minimum teaching loads of faculty have been presented as means of assuring student contact with faculty.

One suspects, however, that deeper meanings can be attached to such actions. There seems to be a general though not always well-articulated feeling among state legislators, state and private governing boards, alumni, and concerned citizens that there exist inefficient, or at least questionable, systems of resource allocation and utilization in our colleges and universities. This might be particularly true of the citizen who lives and is employed in an area of a state where continuing education, advanced education, or re-training opportunities are limited or unavailable.

The problem is aggravated by increasing economic restrictions on institutions of higher learning in recent

years. Signs point to the continuation of such restrictions. Governing boards have in some instances placed moratoriums on new or expanded programs of study, particularly at graduate levels. Such actions usually have been an attempt to restrain unnecessary duplication of programs, particularly from the standpoint of cost.

This emphasis on efficiency in utilization of resources and the concomitant issue of accountability suggest that greater efficiency of resource use -- both manpower and financial -- might be achieved by a system of unhindered concurrent course registration among institutions. That is, students would be enrolled for degree-seeking or certificate purposes in a "home" institution authorized to award the degree or certificate. They would be permitted, however, to enroll in classes at other institutions, with full recognition of credit earned in such classes. In addition to the possibilities of more effective manpower and funds utilization, such a plan would afford more options to the students, particularly those who are within commuting distance of several institutions. A variation would have institutions with an excess of faculty in a given term or year make them available for support of courses and programs in another institution having need of such assistance. Naturally details of coordination would have to be worked out to mutual satisfaction.

This idea is not new, of course. In fact, cross-registration is already in effect in some of our Florida institutions. A local example is the articulation agreement between the University of South Florida and Hillsborough Community College. There may be others. Similar types of cooperative arrangements, usually known as consortia, exist around the country. Their usual purpose is to "...share unique resources, attempt to avoid costly duplication, and employ inter-institutional efforts to develop innovative programs."[1] The American Association for Higher Education in a recent publication lists 80 cooperative arrangements involving almost 800 public and private institutions.[2] Returning to our own state again, the Brumbaugh report almost 20 years ago perhaps unknowingly made a forecast of things to come. That report, applicable to the State University System, suggested the possibility of several institutions concurrently contributing resources and expertise to a given program or study, the responsibility for which had been assigned to only one institution in order to avoid needless duplication.[3]

Some Implications

It seems inevitable that cross-registration and enrollment will lead to institutional research projects of an inter-institutional nature. This can present many challenges to the traditional techniques and rationale used by those conducting institutional research and planning studies. Intra-institutional concerns will have to be broadened to include considerations imposed by institutions other than one's own. There are several questions or factors which need to be considered by institutional researchers. Some of them are presented here. For convenience, they are clustered in a few broad categories with which most of you are familiar. It should be noted that no attempt is made to explore comprehensively each type or area of study. An important point to remember is that conducting institutional research in areas conveniently categorized by type of data is not enough. One must consider the importance of application, purpose, or function in conducting such research. In this discussion the purposes or functions of institutional research are broadly categorized as planning, policy/decision-making, and evaluation. Figure 1 illustrates this relationship.

The discussion is restricted to considerations related to course enrollment. The items that follow are illustrative. With a little reflection, you could add to the list based on your own experience.

Students

Common definitions of student descriptive data, level classifications, and program entry and completion requirements are essential. How can we insure that student level has been uniformly defined on an inter-institutional basis in our studies? When conducting studies on grade averages, drops and adds, degree output, attrition, time required to earn degree, follow-up on gradutes, advanced education or job success, and the like, we should take into account the various institutions' program and course entry and completion requirements. How can we insure that such factors as these are accommodated properly?

Student-evaluation-of-teaching studies, for example, should take into account course objectives as well as

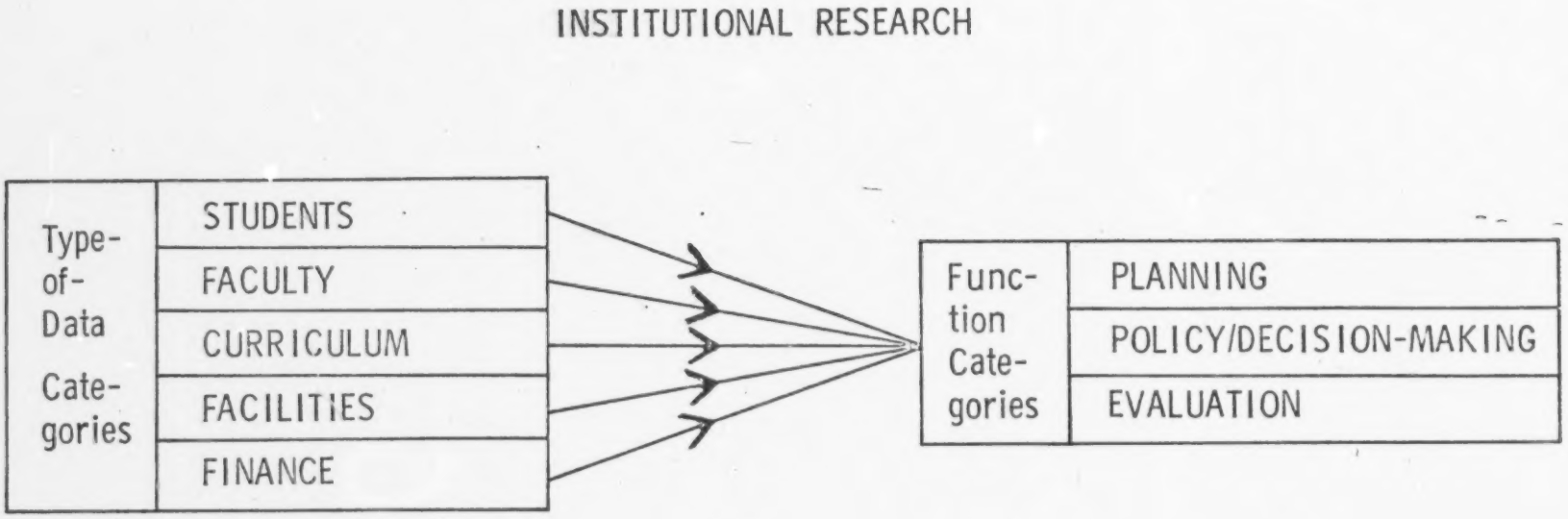

Figure 1. The relationship between type-of-data categories and functional purpose of institutional research.

different modes of teaching such as lecture, discussion, teaching lab, independent study, and the like. There is also research interest in biographical, attitudinal, and other non-cognitive characteristics of students. One example is student-faculty relations. Enrollment studies are another area of concern. How can we be sure that inter-institutional studies in the student area can be based on common or equivalent terms, definitions, and assumptions?

Faculty

The methods used in traditional studies of faculty workload must be examined carefully when inter-institutional registration is involved. The familiar percentage-of-effort technique for measuring the several dimensions of workload may be inappropriate among certain institutions. This would be particularly true when comparing a community junior college to a university, since the overall tasks of faculty are not the same. The percentage-of-effort technique would very likely show close to 100 percent on the average devoted to teaching in the community college, while at the university a considerably smaller percentage would be reported in this category of workload. When measures such as this are related to student enrollment, productivity, credit or contact hours, and the like, serious distortions in analyses could occur. Faculty workload categories must be defined so that inter-institutional comparisons are accurate and meaningful. This is a particularly important point when conducting cost studies. Standardized methods for evaluation of faculty performance are also important. How can we accommodate such measures so that our studies are valid and meaningful?

Studies conducted among institutions regarding the suitability and training of faculty must take into account the goals of the respective institutions. For example, it is obviously inappropriate to compare on a qualification basis the faculty research training in two institutions when one of them has a high research orientation and the other has a low research orientation. Faculty promotion, retention, attrition, attitudes and productivity are also related to institutional goals. How can we insure that our studies take into account the different goals under which the various institutions operate?

Curriculum

Studies of curriculum frequently involve the credit hour as a unit of advancement toward a certificate or degree. The credit hour, however, is used in such a variety of ways and represents such a variety of experience in different institutions that standard definition is almost impossible. Laboratory periods, large-lecture-with-small-discussion scheduling, advanced placement, independent study, credit-by-CLEP, and various other administrative arrangements have confused the value of the credit hour almost to the point that a credit hour, or equivalent credit hour, represents whatever a particular institution chooses to make it at any given time. In conducting studies involving the credit hour how can we insure that we are using a standard unit of measure? Even a substitute for the traditional credit hour -- the class contact hour -- has been interpreted differently by different institutions. Do we know that the class contact hour in our respective institutions represents an equivalent unit of measure?

Another area of curriculum study is the identification of course proliferation and duplication. Inter-institutional study in this area requires that course content and objectives be clearly stated and adhered to. Common course numbering and identification systems for equivalent content will also be of great benefit.

Identification of student educational program patterns is another area of curriculum study. Graduating students' programs of courses can vary widely, even within a given department, due to electives, changes made for transfer students, substitutions, and the like. Such questions as "what is the nature of the major?" "What proportion of the total hours does it consume?" "What use does it make of related areas?" "Do electives give breadth to the student's program or merely allow more specialization?" require standard indicators of course identification, content and objectives.

Another facet of curriculum study is that which aids course planning and review. Knowledge of the course requirements of the various majors combined with identification of student enrollment patterns mentioned previously would greatly aid department or program chairman in reviewing and planning their course offerings and teaching assignments. Institutional researchers can render valuable assistance in such analysis, but only if the data are comparable. Are we prepared to assure our respective constituents that the data in our studies are in fact comparable?

Evaluation of course effects on students is another type of curriculum study, though it has its difficulties. This is done in some cases when course revision is effected. It involves collecting data on student achievement, attitudes, and impressions. Comparisons of gains in different sections of versions of a course by use of achievement tests is often used. Comparison of gains are made with scores from the previous year (statistical control of aptitude differences is assumed). If outcomes from different versions of a course are to be compared, it is essential that comparable evaluation data be available. If such data come from more than one institution, can we be sure of true comparability?

Facilities

Studies of physical facilities, such as the familiar space utilization study, will require standard definitions of room type, function, and use if meaningful inter-institutional comparisons are to be made. If conclusions are to be drawn about the effect of such facilities on the administrative, learning, and instructional process, then the institutional researcher must know that the data used in the analyses are actually comparable. Studies of class size, instructional technology, faculty workloads, faculty office space needs, interrelationships of instructional, research, and administrative space, and scheduling patterns are all a part of this problem. Are we prepared to insure that inter-institutional comparisons in this area of study are reliable? Unless the answer is affirmative, inter-institutional long range planning of physical facilities requirements will be seriously weakened.

Finance

Institutional research in the area of finance covers to some degree all the other areas mentioned. Familiar to most are the traditional studies on income and expenditures by category as defined in College and University Business Administration.[4] Such reports are frequently produced by institutional business offices. More refined studies are required for truly meaningful application in today's educational institutions.

The institutional researcher can conduct special trend studies showing growth or trends in such areas as budget allocations, detailed income sources, salary distributions, fringe benefits, equipment purchases, and the like. Additional studies can relate such resource

allocations to other data about the institution, such as enrollment growth, increases in number of faculty, growth in research and community service programs, size of administrative and other support staff, growth of library resources, cost of constructing and maintaining space and grounds facilities, and the like.

Institutional researchers can augment such analyses by introducing additional data, such as teaching loads, enrollment in courses, number of different courses scheduled, number of different course sections, number of students majoring in each program, and number of degrees conferred in each program, and number of degrees conferred in each program by level -- undergraduate, beginning graduate or first professional, and advanced graduate (doctoral).

Cross-analysis of financial data will be necessary for unit cost studies and is more rigorous than the routine reports usually prepared by business offices. Such data as credit hour loads, student contact hour or student hour loads, and distribution of faculty time among various professional activities must be correlated with salary data to develop basic direct unit costs of instruction, research, and community service. Additional data on the allocation of funds for supplies, equipment, and salaries and wages of secretarial and other nonacademic staff are needed in order to allocate overhead or indirect costs among institutional functions, programs, and instructional levels.

The comparison of unit costs among disciplines, programs, departments, or other organizational units can be of great value in the administration of our educational institutions. This points up the extreme importance of being able to insure comparability of financial data, both within a given institution and among different institutions. How can we as institutional researchers provide such comparability in our financial studies and analyses?

Other Factors

In the process of conducting institutional research in the areas mentioned above, certain other factors must be kept in mind. These include (a) the academic calendar, (b) institutional output measures, and (c) management information systems.

The academic calendars vary among institutions. This must be taken into account in certain types of studies. For example, comparative curriculum and unit cost studies may be distorted unless differing academic calendars are taken into account. Faculty workload and enrollment studies likely will also be affected by the academic calendars of the institutions involved. For example, credit hour equivalencies for different academic term configurations must be utilized in analytical comparisons.

Institutional output measures may likewise affect institutional research findings. Different institutions may have different measures of output depending on the purpose and goals of the institution. Some of these output measures may not lend themselves to a standardization. The institutional researcher will have to devise methods of accommodating this reality. Output measures or proxies themselves are an item for study. Some which we now use are rather simplistic -- even arbitrary. If we in the institutions don't do something toward solving the out put definition problem, it will be done for use by those who may not be adequately informed on the processes and goals of education.

Management information systems, or MIS, is a term familiar to most of us. Briefly, MIS requires uniformity in design and structuring of data coding systems. If the codes cannot be made identical, for various reasons, then they must be reducible to tables of equivalencies. It is very important that institutional researchers be closely involved in the design and implementation of MIS on their respective campuses since they are among the chief users of MIS data. Not to be involved is to invite later frustration when attempting to manipulate the vast amounts of data which will be used on an inter-institutional basis.

CONCLUDING REMARKS

The inter-institutional articulation or coordination arrangements which we are witnessing today probably constitute the beginning of an era of increasing multi-institutional interaction. One aspect of such arrangements -- institutional research on selected factors associated with cross registration and enrollment -- has been discussed here.

The problems and considerations associated with inter-institutional concurrent enrollment and registration will require increased cooperation and coordination of institutional research efforts in our educational institutions and systems. This expanded concept of institutional research activity on an inter-institutional basis will bring into focus such problems and considerations. Hopefully, mutually satisfactory resolution will result. I believe we need a coordinative task force of institutional researchers to start working on these problems. We should also start working on more inter-institutional cooperative studies.

Institutional research reaches its highest value when it has purposive function, such as planning, policy/decision-making, and evaluation. We must begin now to devise solutions to problems associated with cooperative arrangements so that the achievement of these purposes on a meaningful basis will not be endangered.

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STEM (STUDENT TRACKING ENROLLMENT MODEL):

A PROCEDURE FOR QUARTER-BY-QUARTER ENROLLMENT PROJECTIONS

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STEM (STUDENT TRACKING ENROLLMENT MODEL): A PROCEDURE FOR QUARTER-BY-QUARTER ENROLLMENT PROJECTIONS

I. Role and Scope of the Model

The simple model developed in this report is acronamed STEM, Student Tracking Enrollment Model. Its primary purpose is to generate quarter-by-quarter projections of total University enrollment (resident headcount, including staff) from a fixed point in time forward, for as many future quarters as deemed desirable. For example, if September 1, 1970, is selected as the fixed point in time for application of the model, the first quarterly enrollment projection would be for the 1970 Fall quarter, the second projection for the 1971 Winter quarter, the third for the 1971 Spring quarter, and the thirty-third for the 1978 Fall quarter.

It is important to note that when the model is applied at a fixed point in time, data inputs to the model can only properly include information that would actually have been available at that point in time. Hence, projections of the 1971 Spring quarter that would have been generated on September 1, 1970, and on December 1, 1970, respectively, will differ slightly since the data base for the December projection would have included enrollment data for the 1970 Fall quarter that would not have been available for the September projection. Since the data base available to the model is cumulative, more recent estimates of the enrollment for a given quarter can be "expected" to be more accurate. Conversely, of the quarterly projections generated by applying the model at a fixed point in time, those quarters nearest that fixed point in time will generally be predicted more accurately than quarters more distant in time.

II. Data Sources and Availability in Real-Time

The STEM data base includes enrollment and graduation data for the University of Florida, the Florida Public Community College System, and the Florida Elementary and Secondary School System, as well as national data

and projections for the total number of U.S. bachelor's degrees awarded each year. The general nature and chronological availability of each of these data sets are briefly discussed below.

1. UF Data - The number of enrollees in each registration class (to be defined later) for a given quarter is available shortly after the start of each quarter. The number of graduates (degree recipients for that quarter) is known by the end of the quarter. Fall quarter (and trimester) data were used for the years 1963-72, inclusive. Winter, Spring, and Summer quarterly data were used for the period Winter 1967-Spring 1973, inclusive.[1]

2. Community College Data - The headcount number of freshmen and sophomores enrolled in the first (Fall) term and the number of associate degrees awarded during the academic year (terms one, two, and three) in Florida's 28 public community colleges are reported annually by the Division of Community Colleges in Tallahassee. While the official report of these statistics is generally not published for some nine months after the close of a given academic year, unofficial data can be obtained more immediately by direct communication with the Tallahassee office. It was assumed that, by December of a given year, headcount enrollment for the current Fall term and graduation data for the previous academic year were available for inclusion in the model's data base at that point in time. Data were used for the period Fall 1960-Fall 1972, inclusive.[2,3]

3. Elementary and Secondary Public School Data - Annual reports on the number of students enrolled in each of grades one through twelve in Florida public schools and on the number of spring high school graduates (all public and most private high schools) are issued by the State Department of Education in Tallahassee. Again, while the official release of these reports generally lags the occurrence of the data reported by about one year, unofficial reports can be obtained more quickly. It was assumed that, by December of a given year, headcount enrollment for that academic year and graduation data for the previous spring could be obtained. Data used covered the period from the 1957-58 academic year through the 1971-72 year for enrollment data and Spring 1962 through Spring 1971 (except 1963) for graduation data.[4,5]

4. National Bachelors Degree Data - Each year the National Center for Educational Statistics of the U.S. Office of Education issues a report entitled Projections of Educational Statistics, which includes historical data and future projections for the number of bachelor's and first-professional degrees awarded in the U.S. Since time lags are again critical in assessing the real-time availability of this data, it was assumed that during the summer of a given year the report edition with the previous year's data would be received (based on actual experience). For example, in July 1972, the 1971 edition would be available and would contain actual historical data on bachelor's degrees for the 1959-60 year through the 1969-70 year, an estimate of the 1970-71 year data, and projections for the 1971-72 through 1980-81 data. Data incorporated in the model were from the 1968, 1969, 1970 and 1971 editions of this report.[6]

Figure 1 depicts the time sequence of data availability, application of the STEM model, and future projections derived from the model at a particular point in time. Each one of the five rows shown in the figure (each block within a row corresponds to a University of Florida academic quarter) represents a single application of the model at a fixed point in time. The top row is the September 1969 application point; it utilizes past data of the four basic types that would be available up to that point in time, and projects enrollment for all future quarters (in theory, beginning with the 1969 Fall quarter. The second row, which is the December 1969 application, annexes new data received between September and December to the September data base from the row above, and proceeds to project all future quarters commencing with the 1970 Winter quarter. The bottom three rows represent subsequent applications of STEM in March, June, and September of 1970, respectively.

In theory, the model can be applied at any fixed point in time from the present back to any earlier time (so long as some data is available at that earlier point in time) and thereby can generate projections from that fixed point forward. Generally, the projections generated from a current (latest possible) exercising of the model are of greatest interest since the cumulative data base is most complete at the present point in time. In fact, one might question the value of even applying the model at some past point in time since enrollments of past quarters are now history, and the current data base is the best for projecting future quarters. There are two

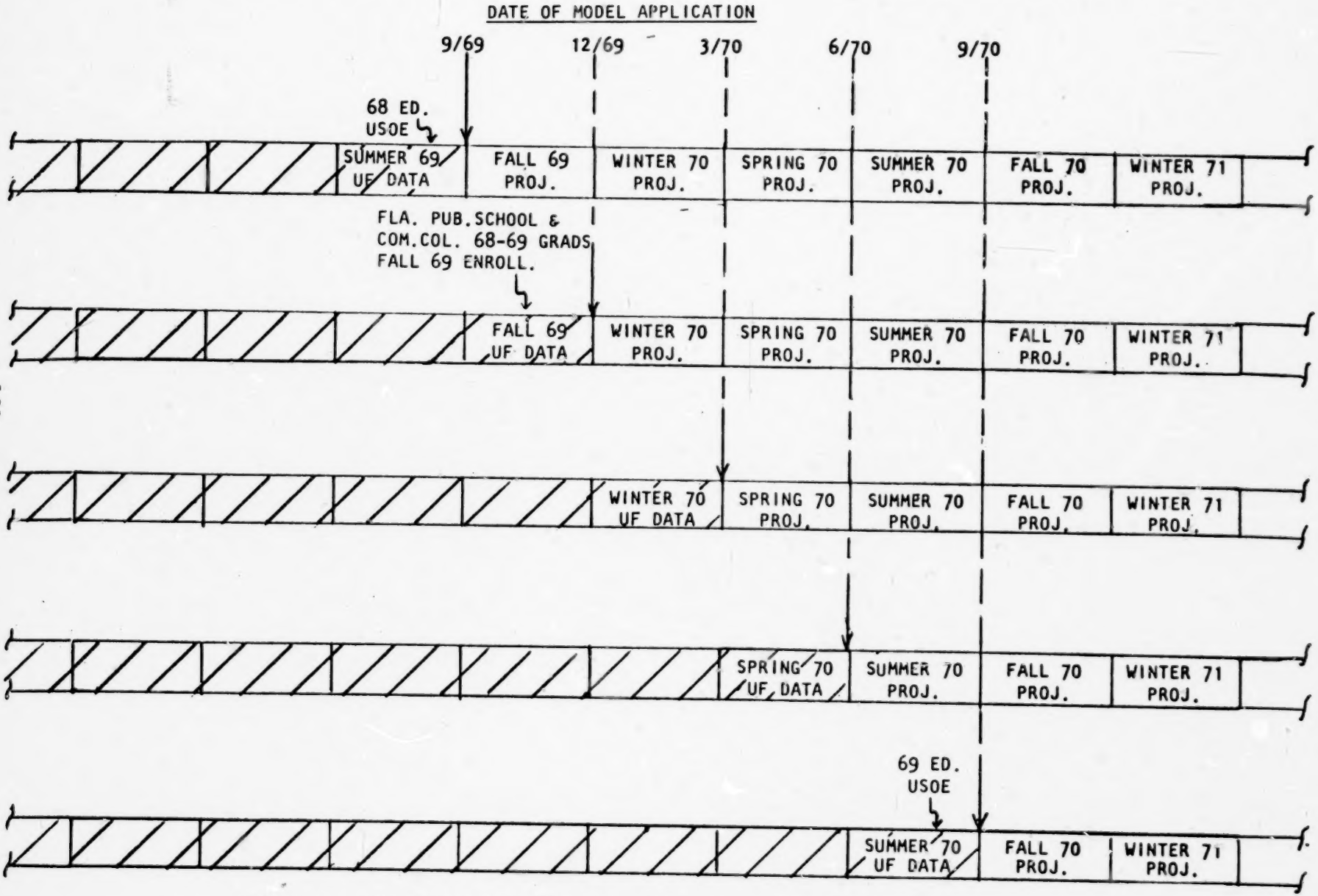


FIGURE I. CHRONOLOGICAL SEQUENCING OF DATA INPUTS AND ENROLLMENT PROJECTIONS

main reasons for such "backtracking." First, if past projections of total enrollment have been significantly inaccurate (or accurate), projecting past known data with the STEM model may provide insight into the source of such inaccuracies. Secondly, while it is granted that most projection models are more accurate in the short-run than the longer-run, comparing STEM projections of past quarters, made at different points in time, with actual enrollment of those quarters provides a benchmark for assessing the expected accuracy of the most recent STEM projections for future quarters. For example, such a comparative analysis may suggest that STEM is generally accurate (within 2% or 3% of actual enrollment) for the first four quarters projected and terribly inaccurate (errors greater than 10%) for quarters more than two years removed from the application point of the model.

III. Registration-Status Classes

Students who are counted in the final official enrollment number in a given quarter at the University of Florida are assigned a registration-status code for that quarter by the University Registrar. Each student is assigned one (and only one since the codes are mutually exclusive) of the following eight status codes: B- beginner, U- undergraduate transfer, G- graduate, M- professional medicine, L- law, C- current, S- skip, or F- former. This registration status breakdown is one useful partitioning of the enrollment for projection purposes since students in each status class come from a unique source (i.e., a pool of potential enrollees for that class), and the collective enrollment behavior of students in various class sources tends to differ significantly and systematically.

The B, U, G, M, L classes have the commonality of being codes assigned only to students enrolling at the University of Florida <u>for the first time</u>. Students who have previously been enrolled at the University and who are now re-enrolling (for the given quarter) therefore comprise the complement classes of currents, skips, and formers (C, S, F). A brief definition of each registration-status class is given below.

B- Beginner

A beginner is a student who has not previously attended college, equivalent to a FTIC (first-time-in-college student).

U- Undergraduate Transfer

A "U" is a student who has not yet received a baccalaureate degree and who is transferring to the University from another institution of higher education.

G- Graduate Student

A "G" is a student who has already received a baccalaureate degree and is enrolling at the University for the first time (except those enrolling in the professional law or medicine programs). Not all students coded G for registration purposes have been formally admitted to a regular graduate degree program at the University (those who are would be assigned a "7" academic-level class designation); these post-baccalaureate students are assigned a "6" academic-level class code.

M, L- Professional Medicine and Law

M's and L's are students matriculating into either the professional medicine or professional law degree programs and who have not previously enrolled at the University.

C- Currents

For a given academic quarter, currents are registered students who were also enrolled the previous quarter.

S- Skips

Skips are students not enrolled the previous quarter but who were enrolled two quarters ago. Commonly, many students enrolled in the Spring quarter skip the Summer quarter and re-enroll as "skips" in the Fall quarter.

F- Formers

A former is a student who has previously been enrolled at the University but who is neither a current nor a skip, i.e., he (she) was last enrolled three or more quarters in the past.

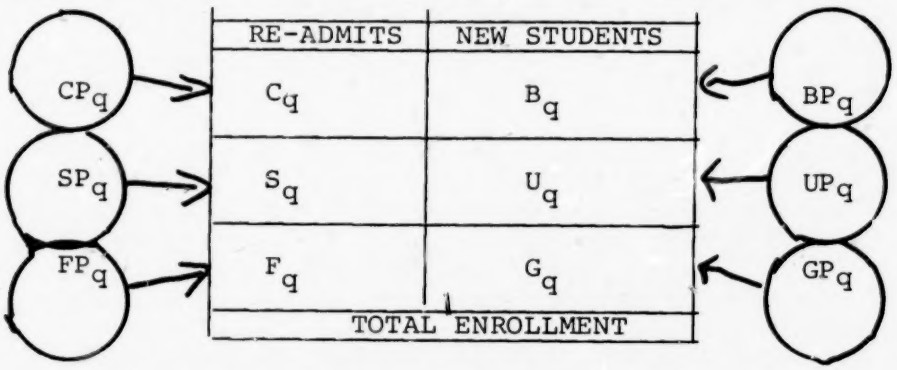
Since registration-status classes were selected as the basis for partitioning and projecting enrollment, several clarifying comments about these definitions and their use in the STEM model need to be made before proceeding further. First, it is important to note that the registration code assigned to a student for a given quarter is effective only for that particular quarter, i.e., the student's code can change from one quarter to the next. For example, a student matriculating at the University for the first time must be a B, U, G, M, or L that first quarter but cannot be designated by any of these codes thereafter. An undergraduate transfer (u) in the Fall quarter who re-enrolls for the Winter quarter is automatically a current in the Winter quarter. A given student who started at the University, transferred to another school and then back to the University, might have the following registration code sequence for six quarters of University enrollment: B, C, C, S, F, C. Note that this student is not coded "U" when he transfers back to the University since he (she) was pareviously enrolled at the University. The code sequence for any student must start with B, U, G, M, or L and thereafter continue with a mixture of C's, S's, and F's.

Secondly, the STEM model does not use the full set of either codes. In particular, M and L codes were merged with the G code so that hereafter the "G" code includes the G, M and L classes, as defined above. Recall that the rationale within the projection model for the class partition is that students in different classes are drawn from different pools of potential students for a given quarter. A given "source pool" may differ from another in its definition and composition and also in the collective enrollment propensity of students in the pool. Such differences are both crucial and necessary for accurate projections. G, M, and L students are all drawn from the pool of students possessing at least a bachelor's degree and not previously enrolled at the University (a few medical students are admitted without the bachelor's degree). While it is theoretically possible to identify subsets of this pool who are more likely to become M's

or L's rather than pure G's, such as pre-med or pre-law majors, the additional computational expense within the model was not considered worthwhile. Also, M's and L's account for less than one-half of one percent of the University enrollment and hence their inclusion in the G class has little impact on the projections. Commencing with the 1972 Fall quarter, a few students were coded "D" who were enrolled in the new professional dentistry degree program. This new D code is analogous to the M and L codes and was likewise subsumed within the G-code class.

IV. Mechanics of the STEM Model

The internal workings of the STEM model will be only briefly summarized since a detailed elaboration is rather lengthy. Basically, the projected enrollment for each of the six registration classes in a given future quarter is simply the product of the estimated pool of potential enrollees and the fraction of that pool expected to actually enroll. For example, if CP_q is the pool for currents in quarter q and r_q^c is the ratio or fraction expected to enroll, the projected number of currents is $r_q^c.CP_q$ and forms one component of the projected total enrollment, E_q. See Figure II below.



$$E_q = r_q^C CP_q + r_q^S SP_q + r_q^F FP_q + r_q^B BP_q + r_q^U UP_q + r_q^G GP_q$$

FIGURE II. THE SIX ENROLLMENT CLASSES AND THEIR SOURCES FOR GENERAL QUARTER q.

The pools for the three classes of new students (B, U, G) are, respectively, the numbers of Florida High School Graduates, Florida public Community College graduates

and national bachelor's degree recipients in the previous academic year. These three pools were used as the "most representative" sources of the three classes of new students, but clearly do not exhaustively encompass the true sources of all such students (for example, non-Florida freshmen, undergraduate transfers from private institutions, foreign graduate students, etc.). In effect, the three identified pools operate as surrogate pools for new students originating from other sources. So long as such students from these other sources are few in number or exhibit enrollment behaviors similar to students in their corresponding surrogate pool, the effect on the overall enrollment projection is slight.

Projecting the ratios of realized enrollment from these pools for new students can be quite challenging since the ratios are subject to both random and systematic influences from many sources. In lieu of a more detailed casual model to account for the variation of these ratios, a time-series model was used for the U and G pool ratios. This model utilized the modified exponential curve with exponentially smoothed coefficients since both ratios had historically exhibited nonlinear trends between fixed upper and lower bounds. The pool-ratio method technically was not used to project the beginner class enrollment due to the freshmen quota observed by the University. However, projections of the pool of Florida high school graduates were still required since this pool also directly feeds the community college enrollment and hence indirectly feeds the University enrollment of undergraduate transfers.

The three pools for students being readmitted to the University in a given future quarter are derived from enrollments of past quarters. Figure III depicts this flow of the enrollment in quarter q over the next four quarters. A certain fraction of E_q will receive degrees at the end of that quarter and exit the system into the degree pool, D_q. All others are potential currents for the next quarter q+1 and hence flow into the pool CP_{q+1}. Those in CP_{q+1} who do enroll next quarter become the currents of quarter q+1 (shown as a subset of E_{q+1}), and those who do not enroll flow into the skip pool, SP_{q+2}, since they are potential skips for the following quarter, q+2. Those in SP_{q+2} may enroll in quarter q+2 (forming the S_{q+2} component of E_{q+2}) or not enroll and thereby flow into the former-one pool for future quarter q+3, labeled as $F'P_{q+3}$. Those in $F'P_{q+3}$ who do not re-enroll as formers in quarter q+3 flow into a former-two pool for quarter q+4, from which they either rejoin the

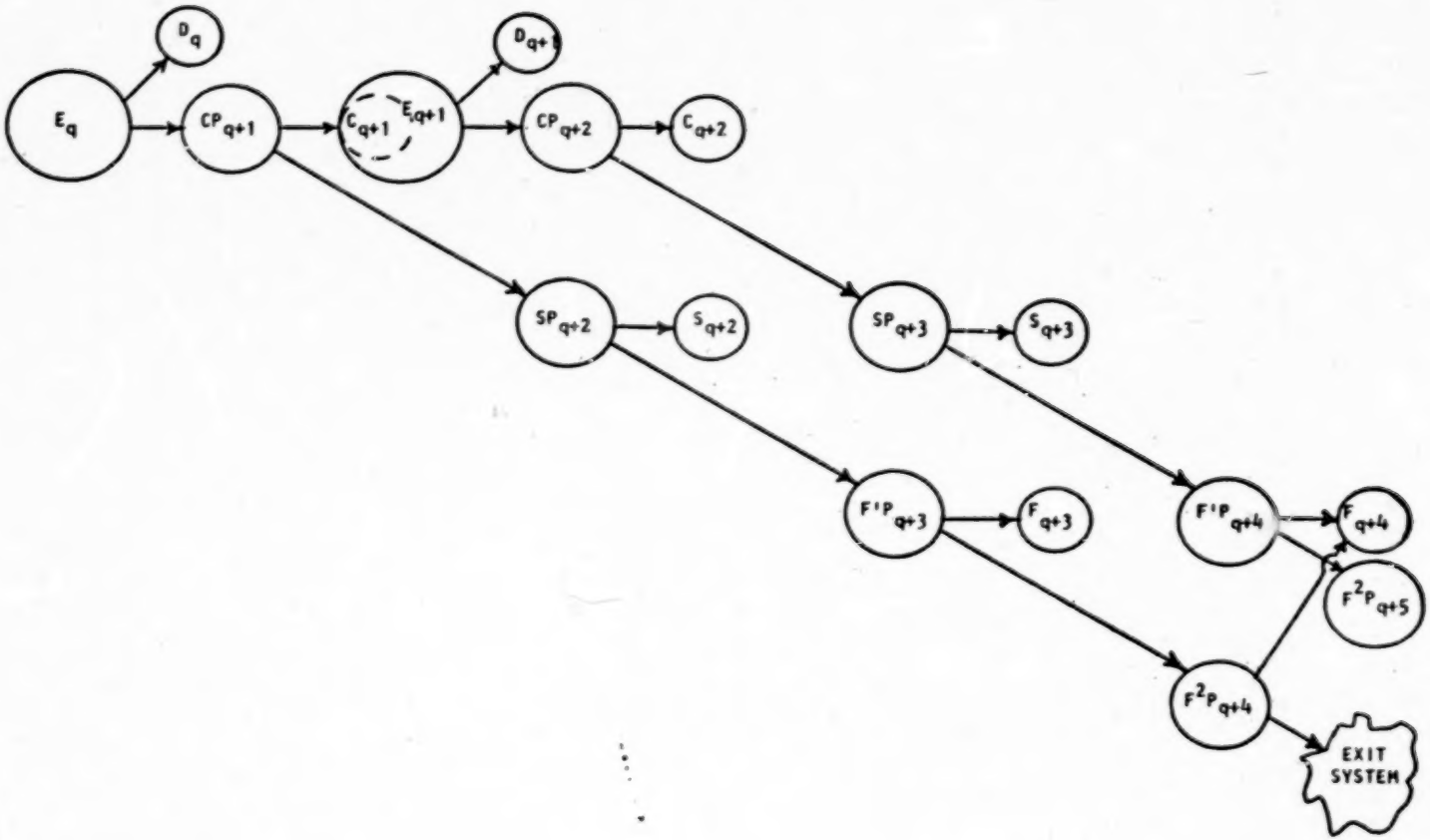


FIGURE III. SEQUENTIAL FLOW OF STUDENTS COMPRISING ENROLLMENT IN QUARTER q OVER NEXT FOUR QUARTERS, q+1 TO q+4

University or exit the system. Students may, in fact re-enroll at the University after an absence greater than four quarters, but their retention within the model for an unlimited time would unrealistically inflate the pool of potential formers and thereby distort the former-to-pool ratio (also an excessively long history would be required to initialize the model for the first projection).

The enrollment-to-pool ratios required in the internal flows described above vary substantially across quarters within an academic year. For example, the yield from the current pool is only about 43% for the Summer quarter but 87% to 92% for the other three quarters. Likewise, the number of degree recipients is just four or five percent of the total enrollment for the Fall and Winter quarters, but jumps to about 11% for the Spring quarter and 15% for the Summer quarter. However, the ratios for a given quarter of the year are relatively stable over time and exhibit mostly random, as opposed to systematic, variation. Hence these ratios were projected by exponentially smoothing their past time series rather than by using a more complex trend projection technique (note: an exponentially smoothed average is similar to a moving average but places greater weight on more recent observations).

V. Results

To guage the general accuracy of STEM, the model was applied immediately prior to the start of each quarter from Fall 1969 through Fall 1972, inclusive, and utilized only data that would have been available at those points in time. At each point of application, projections for future quarters must be generated one by one in sequence since certain pools are dependent upon the enrollment and pools of the prior quarter. These projections were then compared with actual enrollment, as detailed in Tables I and II. It should be emphasized that these were not official University projections for these now-historical quarters. The 1969-72 time span was used, however, to assess the accuracy of such a quarterly projection model over time and thereby provide guidelines for future uses of the model.

As expected, STEM projections are generally more accurate with a shorter projection horizon. As shown below in Figure IV, there is no sudden abrupt jump in

TABLE 1. STEM PROJECTIONS FOR UNIVERSITY OF FLORIDA HEADCOUNT

	Academic Quarter					
Time of Proj.	F69	W70	SP70	SU70	F70	W71
9/69	20,550	19,352	18,390	8,273	21,167	19,934
12/70		19,532	18,526	8,318	21,367	20,124
3/70			18,516	8,335	21,383	20,223
6/70				8,313	21,369	20,217
9/70					21,669	20,477
12/70						21,045
Actual Enroll.	20,741	19,652	18,620	8,866	22,253	21,205

	SP71	SU71	F71	W72	SP72	SU72	F72
9/69	18,953	8,493	21,503	20,246	19,260	8,613	21,659
12/69	19,122	8,557	21,563	20,271	19,257	8,592	21,525
3/70	19,149	8,579	21,595	20,387	19,302	8,621	21,571
6/70	19,213	8,571	21,594	20,390	19,376	8,615	21,579
9/70	19,459	8,992	21,997	20,758	19,727	9,087	22,067
12/70	19,994	9,2[illegible]	23,184	21,942	20,870	9,649	23,697
3/71	20,076	9,361	23,268	22,173	21,039	9,731	23,839
6/71		9,469	23,476	22,342	21,362	9,860	24,085
9/71			23,534	22,384	21,402	10,033	24,143
12/71				22,540	21,615	10,115	24,336
3/72					21,339	10,056	24,236
6/72						9,903	23,983
9/72							23,801
	20,370	9,776	23,496	22,324	20,931	10,341	23,570

TABLE II. PERCENT ERROR OF STEM ENROLLMENT PROJECTIONS
(minus sign indicates under-estimation)

Time of Proj.	Academic Quarter					
	F69	W70	SP70	SU70	F70	W71
9/69	-0.9%	-1.5%	-1.2%	-6.7%	-4.9%	-6.0%
12/69		-0.6	-0.5	-6.2	-4.0	-5.1
3/70			-0.6	-6.0	-3.9	-4.6
6/70				-6.2	-4.0	-4.7
9/70					-2.6	-3.4
12/70						-0.8

	SP71	SU71	F71	W72	SP72	SU72	F72
9/69	-7.0%	-13.1%	-8.5%	-9.3%	-8.0%	-16.7%	-8.1%
12/69	-6.1	-12.5	-8.2	-9.2	-8.0	-16.9	-8.7
3/70	-6.0	-12.2	-8.1	-8.7	-7.8	-16.6	-8.5
6/70	-5.7	-12.3	-8.1	-8.7	-7.4	-16.7	-8.4
9/70	-4.5	-8.0	-6.4	-7.0	-5.8	-12.1	-6.4
12/70	-1.8	-4.9	-1.3	-1.7	-0.3	-6.7	0.5
3/71	-1.4	-4.2	-1.0	-0.7	0.5	-5.9	1.1
6/71		-3.1	-0.1	0.1	2.1	-4.7	2.2
9/71			0.2	0.3	2.3	-3.0	2.4
12/71				1.0	3.3	-2.2	3.2
3/72					1.9	-2.8	2.8
6/72						-4.2	1.8
9/72							1.0

the model's inaccuracy as the projection lead-time increases, but rather a fairly steady loss of just under 1% accuracy per quarter of future time.

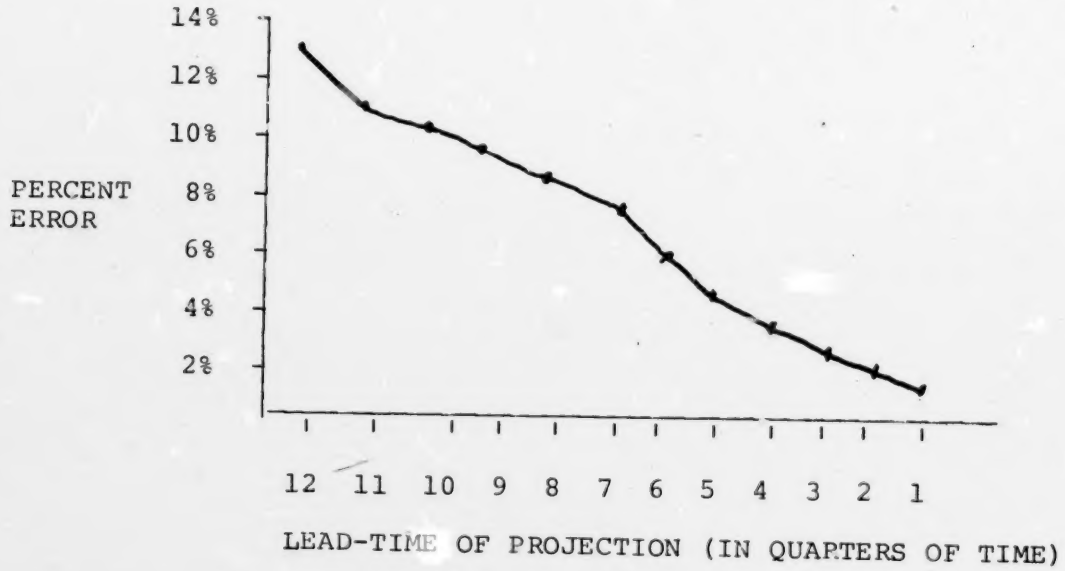


FIGURE IV. ACCURACY OF STEM ENROLLMENT PROJECTION AS A FUNCTION OF PROJECTION HORIZON

However, this overall pattern of the-closer-the-better does not hold in every individual case. One might note the thirteen projections for Fall 1972 enrollment as one example of such a deviant case, one which also highlights the somewhat curious enrollment patterns that many schools experienced during the 1969-72 period. In September, 1969, the full extent of the rapidly increasing popularity of higher education was not foreseen (within the model and its data base), and the projection for Fall 1972 was accordingly low by some 8%. However, the more-than-expected enrollment gains of the next year buoyed the projection upward such that it was nearly perfect (off by only 0.5%) as of December, 1970. Enrollment continued to accelerate (relative to expected) the next four quarters, and consequently the December, 1971 projection was some 3.2% too high. However, note that signs of weakening became manifest over the next few quarters as the projection was consistently lowered from its peak in December, 1971. The final projection was just 1% too high and captured most of the "leveling off" phenomenon that characterized the actual enrollment for the Fall 1972 quarter.

VI. Conclusions

A quarter-by-quarter tracking model, such as STEM, can generate more detailed and generally more accurate projections in the short-run than a model which keys only on Fall quarter enrollments. Many changes can creep into the enrollment-generating process during the non-fall quarters and can be annexed immediately into the model's data base. Also, separate projections for Winter, Spring and Summer quarters may be useful for a variety of planning functions.

The STEM model presented in this paper is strictly a prototype to demonstrate the general mechanics and possible utility of such a model. Refinements are many and obvious. Each pool for re-admitted students could be partitioned by class level, college, sex, etc., to refine the projection of returning students. The current status of admissions and acceptances could be inserted into the model to refine the projections of new students in the very short run of one to three future quarters. Causal models could be built to better project certain ratios which exhibit curious modes of behavior over time. The basic STEM model can be refined to almost any point, given the necessary time, resources, and persistence.

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